

The Mining Journal

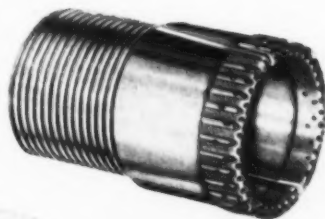
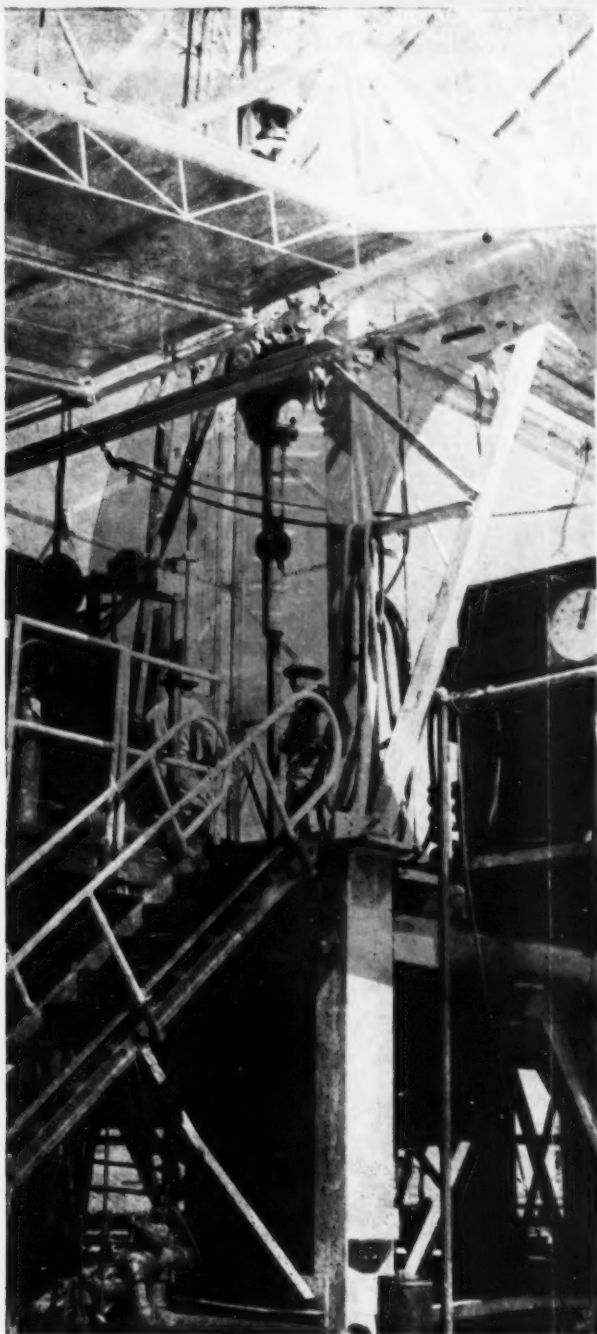
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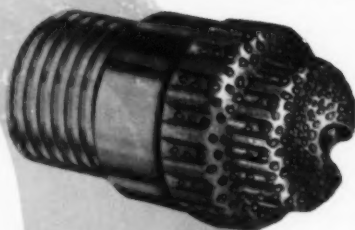
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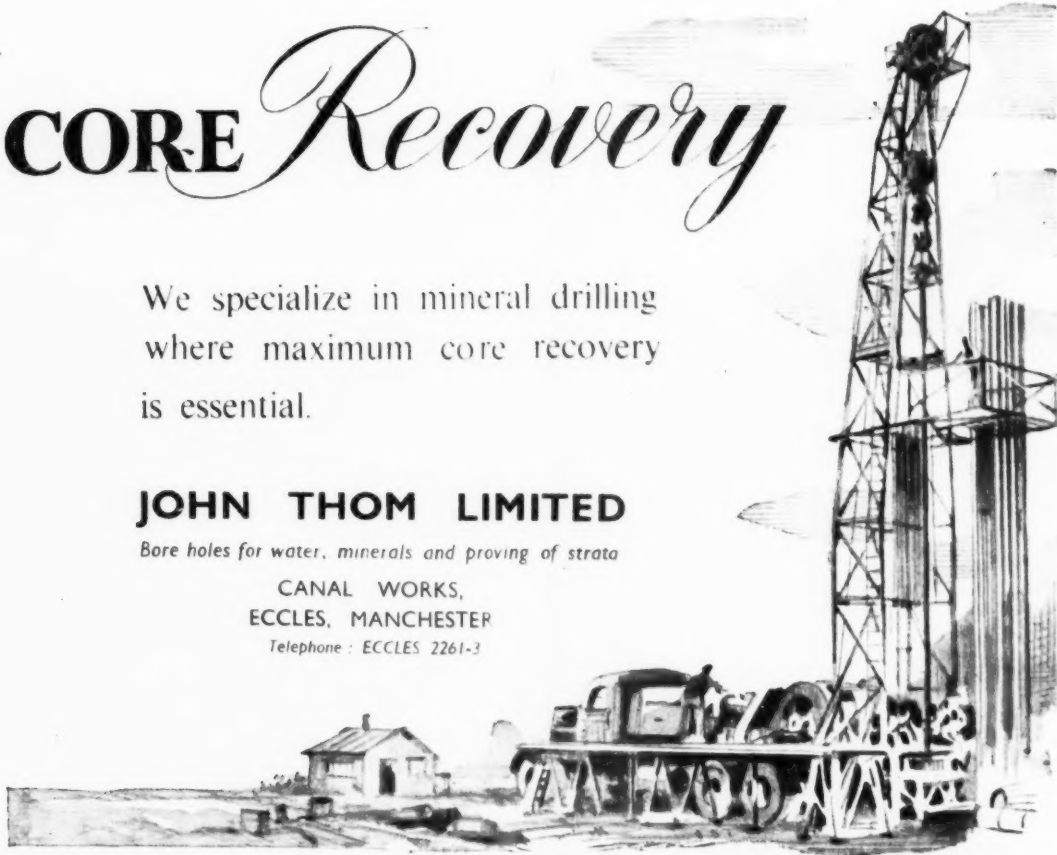
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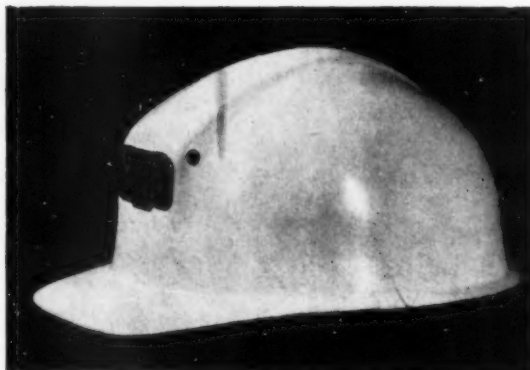
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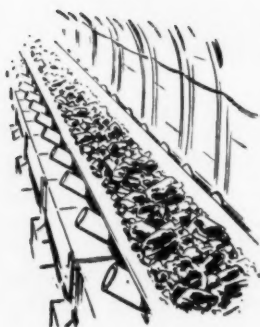
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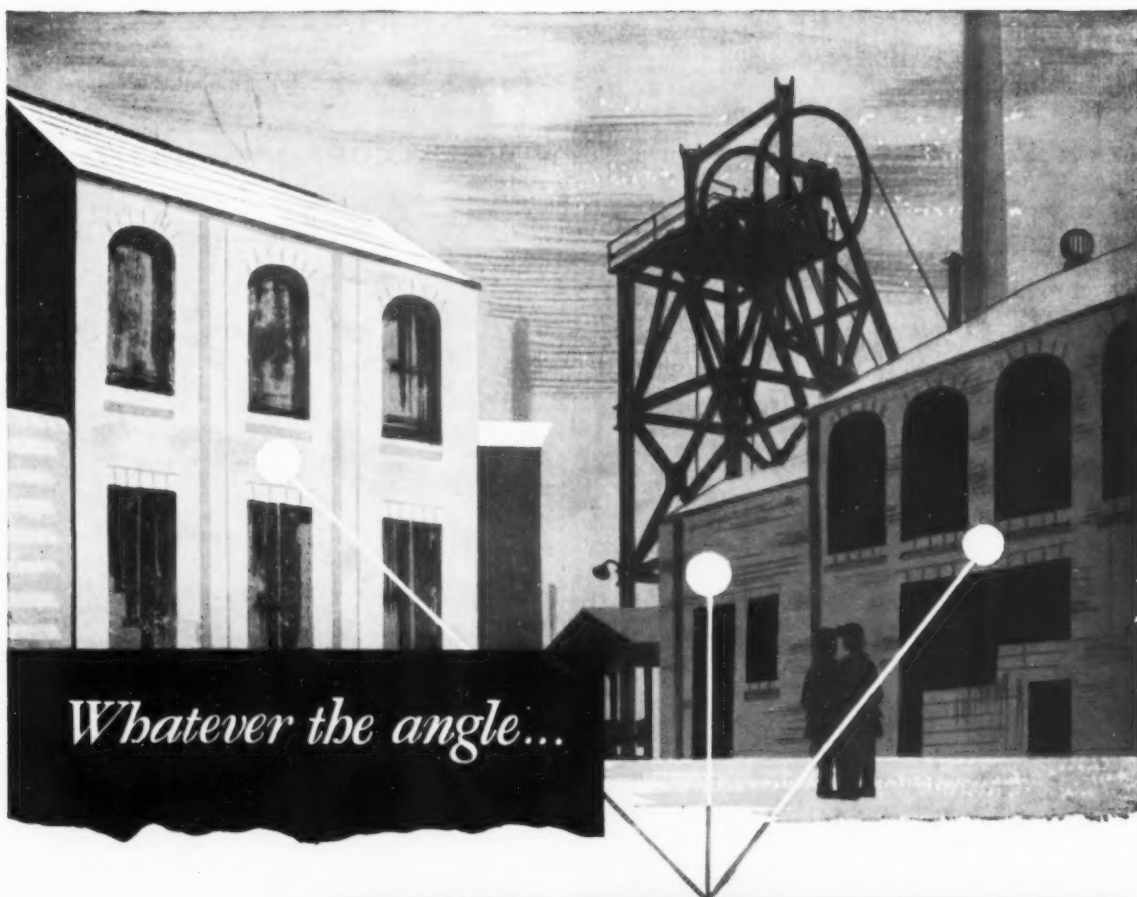
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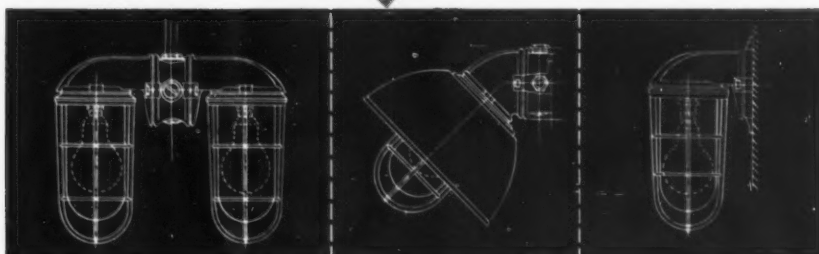


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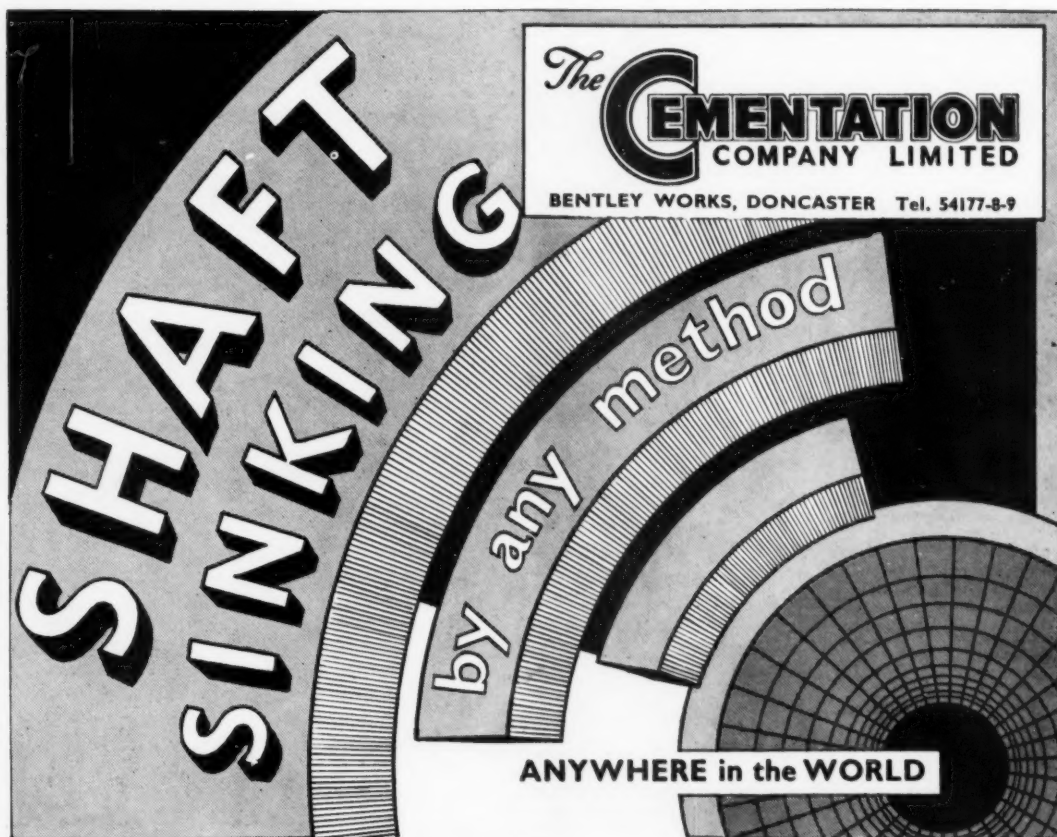
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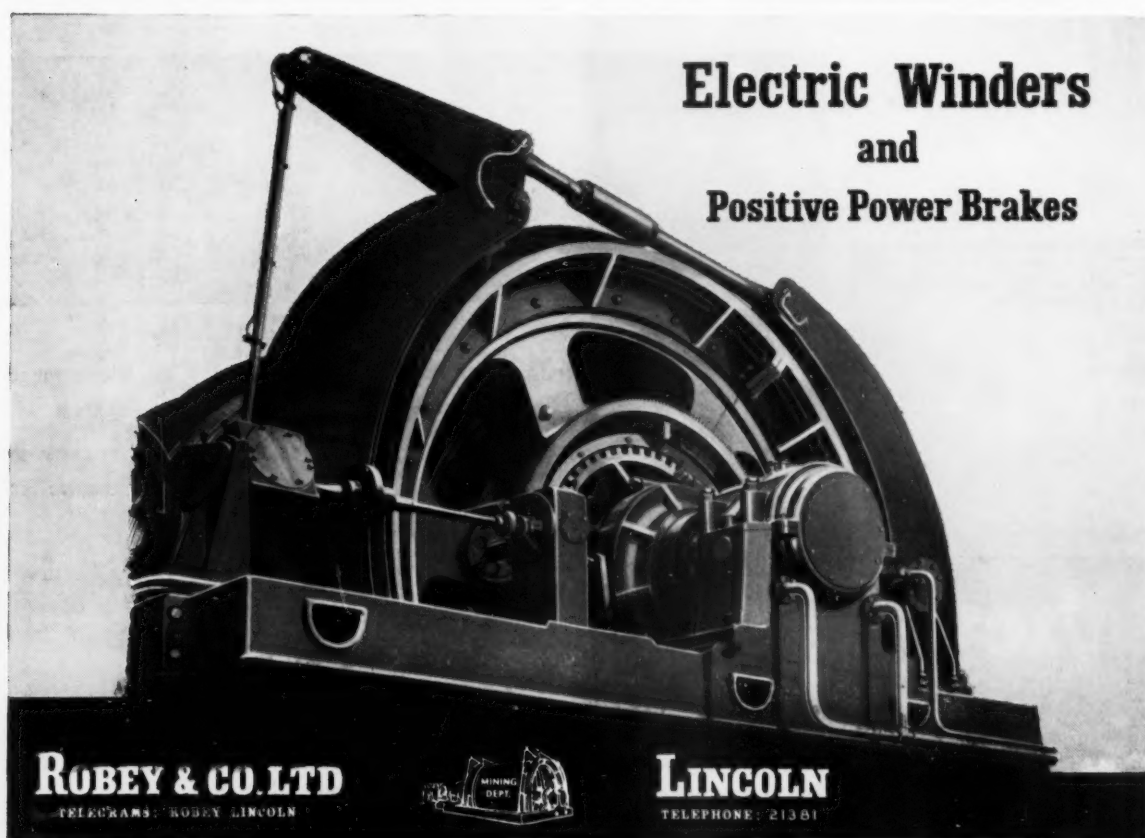
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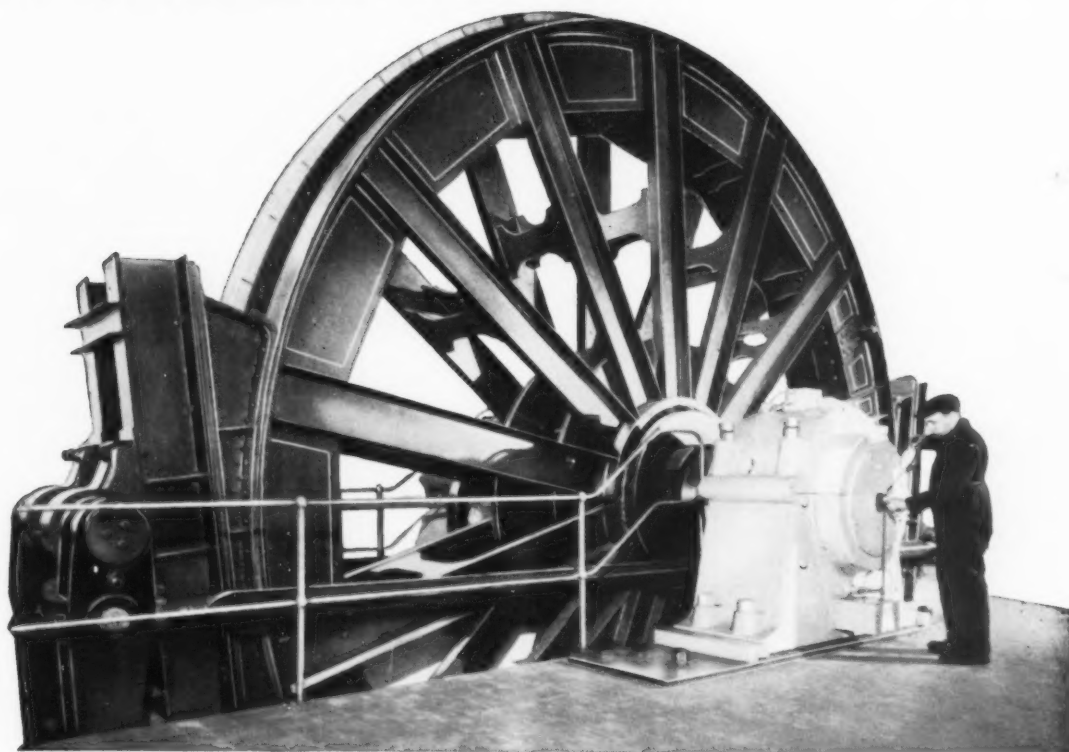


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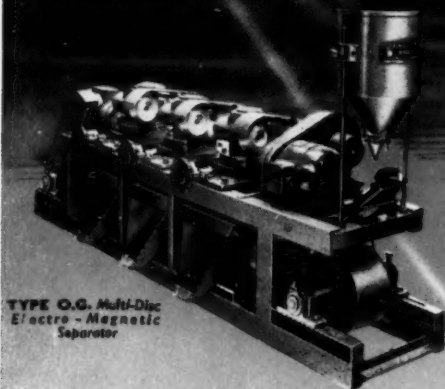
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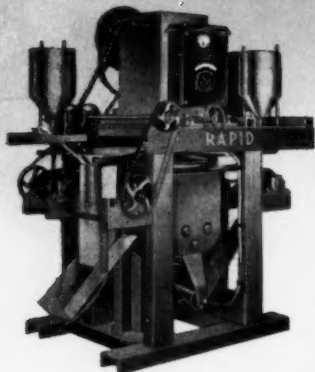
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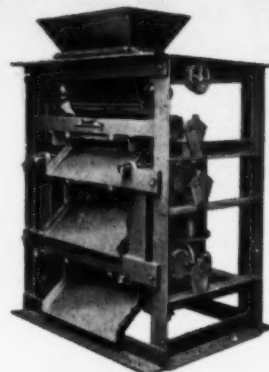
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The Mining Journal

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NOTES AND COMMENTS

The Cost of "Investing in Coal"

When the Coal Board in October, 1950, published their *Plan for Coal* they quite rightly forecast that the assumptions made in its compilation would not prove completely accurate. The plan was based on a detailed survey of existing collieries and potential new capacity, and as the then Chairman of the National Coal Board, Lord Hyndley, himself stressed "the Plan was a flexible one which would have to be revised as time went on". This promised revision is now revealed in the publication this week of *Investing in Coal* issued by the N.C.B. The delay in completion of the bigger schemes and the great increase in the costs of these has not only resulted in a revision of *Plan for Coal* but rather a completely new edition. This reveals that the estimates given in 1950 have proved particularly inaccurate.

Whilst the original Plan was to cost £635,000,000 in the sixteen-year period between 1950 and 1965, to boost the output of British collieries from 202,000,000 tons to 240,000,000 tons, it is now estimated that the 1965 deep mine production will not exceed 230,000,000 tons and that this will only be achieved after an expenditure of £1,350,000,000.

Already £350,000,000 has been spent, but the increase in national output has been disappointing. 210,000,000 tons in 1955 as against 202,000,000 tons in 1949. The N.C.B. gave as the reason for this staggering increase in the cost of the national scheme, the steep rise in prices, under-estimation of difficulties involved in carrying through a scheme of such magnitude, together with the inclusion of additional products.

The new manpower estimates differ considerably from those of 1950. Instead of the *Plan for Coal* estimate of 618,000 mineworkers in 1965, the Board now reckons that the industry will require 682,000 with an output per man-year of 319 tons in 1960, and 672,000 with an output per man-year of 342 tons in 1965.

Despite the increase in mechanization and the progress of reconstruction, the new estimates give a less optimistic forecast for future output per man-year than was implicit in *Plan for Coal*. There are two main reasons: the decline in the proportion of saleable coal in total colliery output is

currently proceeding at a rate of about 1,000,000 tons per year; the second reason is that the 1950 estimates expected an increase of 2½ per cent in the attendance, which has not been obtained so far.

In the first six years of the Plan £350,000,000 has been spent on collieries and ancillary activities, and according to the new plan a further £860,000,000 will be spent within the next ten years. Two-thirds of this total will be spent on major projects, scheduled for completion by 1965, each costing more than £250,000, and a further £120,000,000 will have been spent on schemes which will not, however, be producing by this time.

Together with £140,000,000 to be spent on carbonization and manufactured fuel activities, open-cast plant, workshops, etc., the result is the formidable total of £1,350,000,000.

Thus in effect £1,230,000,000 will have been expended on schemes in production by 1965, and with what benefit? Deep-mined output will be up by 28,000,000 tons on 1949 figures. Even allowing for expenditure incurred in replacing decaying capacity—some 4,000,000 tons per annum—the result is that approximately £15 capital is to be invested for every additional ton of yearly saleable output.

This investment is large, but as is pointed out in the Coal Board's publication, it is broadly comparable with the volume of investment already taking place in the Continental coal industries. It will represent something of the order of 10d. out of every 20s. invested within the British economy. Over the next ten years the Board reckon to be able to provide by internal financing, such as depreciation provisions, about two-thirds of the money required to carry out the revised plan. This assumes that the selling price of coal will cover production costs over this period, and that productivity will rise. In the original Plan, internal financing was to provide three-quarters of the money required for reconstructing the industry over the whole period up to 1965, but over the past six years it has only provided one-half.

To help finance the reconstruction of the industry the Board is seeking authority to borrow a further £350,000,000 in addition to the £300,000,000 loan approved by Parliament in 1951. The Bill to give the Coal Board this further

borrowing power was formally read before Parliament on Monday, but met with opposition from a group of Conservative M.P.s.

In summing up it may be said, that the new *Plan for Coal* is certainly less wildly optimistic than was the original plan, and although some of the contents may be unpalatable, *Investing in Coal* is a balanced exposition of past achievements and future policy and expectations and does at least let the public know the worst. Whether or not, the anticipated results appear commensurate with the capital outlay, Britain needs this 240,000,000 tons of coal to form the backbone of the 300,000,000 tons fuel and energy requirements needed by 1965.

Future of Chile's Copper Dependent on Currency Reform

The establishment of a free rate of exchange for the peso over much the greater part of Chilean overseas transactions (certain "invisibles" movements are excepted) is the second instalment of the economic reform programme devised by Klein and Saks, the American consultants. The first instalment consisted of a wages and prices freeze (see this column, December 2, 1955, and January 13, 1956); it immediately provoked an abortive general strike but the workers, though restive, have so far not again rebelled against it.

Supporting these major instalments of economic reform has been a steady pressure on credit which has become both tighter and dearer. The new exchange structure replaces a complex of exchange rates (one of which was free) designed both to encourage and discourage selected exports and imports. The new peso rate is a freely fluctuating one—that is it has no fixed parity with the dollar—but it has nevertheless received the blessing of the International Monetary Fund. No doubt, the Fund will expect to see a fixed rate in the future but in the present circumstances it is clearly the wiser course to let the peso float to find out its true level. It is worth recalling, too, that the Fund (even under its widened operating rules) is bound to restrict itself to correcting short-term disequilibria and is therefore reasonably assured that, with its help, the Chilean economy can be brought under control. The Fund has offered, for one year, facilities for buying up to \$35,000,000 of any currencies the Fund holds; private American Banks have opened lines of credit of \$30,000,000 and an agreement for \$10,000,000 drawing rights has been made with the American Treasury. Armed with this cash the Chilean Government will be able to buy pesos in the open market to keep the exchange rate tolerably steady.

The success of the operation, of course, depends entirely on the Government licking the Chilean economy into shape before the currency support funds run out. Klein and Saks were quite successful with their strict credit schemes in Peru five years ago. Whether they will succeed in Chile remains to be seen, but there is this difference and it is worth pointing out; the Peruvian economy—and especially that of 1949—was of a much more elementary character than that of present-day Chile and the more primitive the system, the more easily it can take dire and unobvious medicines. One other unknown factor of extreme importance in this coming critical year is the likely course of copper prices.

An additional source of help to the Chilean Government is the sale of \$30,000,000 by the big copper companies at the (now special) rate of 300 pesos to the dollar. This sum will be used to subsidize certain essential commodities made more expensive by the free exchange rate, which would otherwise raise the cost of living sharply. Obviously, these additional funds will help to preserve the prices—wages freeze while at the same time they will take some of the wind from the sails of the union for it has been a

common complaint that under the new copper legislation, the companies are much better insulated from inflation than the workers. Again, there is a question—will 9,000,000,000 pesos last long enough to perform their task? Political pressure will be on the side of giving too generous a level of support for domestic prices and setting too optimistic a rate of peso exchange and though President Ibanez may be expected to push through his reforms with vigour, he has to contend with a predominantly left-wing Congress, to whom most of them are distasteful. This is Chile's really testing time, but if she comes through it successfully, the future of copper mining in that country will look extremely good.

Western United States

(From Our Own Correspondent)

Portland, Oregon, March 31.

AFL-CIO has under discussion a plan, which has been expected, to form a new union to represent the workers in the non-ferrous mining industry. The object would be to supplant Mine, Mill and Smelter Workers' Union which has represented the non-ferrous workers for years but with diminishing prestige since it was expelled from CIO in 1950 and has been compelled to function as an independent union since. Formation of the new union may be resisted by United Steel Workers (CIO) which has gained a considerable non-ferrous membership by raids on Mine-Mill and by the very powerful Teamsters' Union which has a mutual assistance agreement with Mine-Mill. However, there is no doubt that the non-ferrous workers are sufficiently numerous and important to maintain a strong union of their own. With the present high activity in the industry and current prices of metals it seems inevitable that the coming season will see demands for new wage contracts.

With the consolidation of forces organized labour is planning on going into politics more actively than ever. Plans are under way to collect a \$3,000,000 fund to be used in the forthcoming campaign for education of voters and contributions in critical areas. Labour is traditionally Democratic in politics and the goal is a Democratic victory in both Administration and Congress.

COMPENSATION FOR GOLD OPERATORS

The gold mine operators who suffered damage through War Production Board order L208 of October 8, 1942, have won the third round in their battle to secure compensation for their losses.

The first round was when the Court of Claims, before which such actions must be filed, overruled the government's motion to dismiss and the second when the court held, as a matter of fact, that petitioners had been damaged by the order (*The Mining Journal*, May 14, 1954). This third decision, dated February 20, 1956, holds that the government is liable for damages sustained by the operators. The decision is unequivocal in stating the order "amounted to a temporary taking of property right" and "such mine owners and operators are entitled to be paid just compensation within the meaning of the Fifth Amendment to the Constitution".

The case will undoubtedly be appealed to the Supreme Court. If the Court of Claims is sustained the next step will be for each company to appear individually and prove the extent of damage. Homestake presents the largest claim, \$11,000,000, and Idaho-Maryland second, \$5,000,000. Interest will be asked from June 30, 1945, the date of revocation of the order.

Tunnelling Record at Doornfontein

(From Our South African Correspondent)

Doornfontein, the gold and potential uranium producer situated on the West Wits line, established a new world record for hard rock underground tunnelling when a total of 1,508 ft. was advanced in the 26 days ended March 27.

The record breaking performance was achieved in the No. 1 crosscut which is 5,850 ft. below the surface and is being driven towards the site of a future sub-vertical shaft to serve the deeper levels of the mine. It is interesting to note that the mining techniques used at Doornfontein differed only in degree to those used at Harmony in May, 1955, when the previous world record was established of 1,394 ft. during 26 days. In both mines full diamond drilling cover was provided against the intersection of water-bearing fissures. This was accomplished by drilling four pilot holes 12 ft. 6 in. long in every round and diamond drill holes were put through to 610 ft. in advance of the end, at 400 ft. intervals thereby giving a minimum protection of 140 ft. The rock formation being penetrated is



An Eimco 21 Rocker shovel in the St. Fillan section of the Breadalbane Project, Scotland

the quartzite of the Witwatersrand system, and explosives used were of 1½ in. x 60 per cent ammon-gelignite with fuse blasting.

The work was carried out on a four-shift basis, each shift cleaning, drilling and blasting two rounds of 8 ft. Each shift consisted of one shift boss, one developer, one cleaner and construction man with their respective teams of natives. Equipping of the drive was conducted simultaneously. Cleaning was carried out with a model 21 Eimco loader operating on an air pressure of 80 lb. p.s.i. A recorder in the tunnel kept operators fully informed on air pressure conditions at the face. At Harmony only one loader was used throughout the job, but at Doornfontein a standby machine was used to enable the main loader to be kept in tip-top condition by servicing it at intervals.

Loading was by 4-ton Granby cars, fitted for air-operated ram tipping. Twenty-seven cars were used in trains of six or seven pulled by four 4-ton Hunslet Diesels on a 24 in. track. Exchange of full and empty cars was



Loading with scraper at Doornfontein

done by a traverser about 50 ft. from the face. This was moved forward at 80 to 90 ft. intervals. Rail extensions for cleaning were carried out using 10 ft. rail sections and 15 ft. sliding rails.

The end is equipped with 6 in. air and 4 in. water columns and 30 in. ventilation columns, 45 lb. track and an 18 in. pre-cast drain, all of which were completed to within 100 ft. of the face. Ventilation arrangements provided from 9,000 to 10,000 cu. ft. of air per min. while exhausting was carried out with a 16 in. blower overlapping into the face. This allowed the re-entry period to be kept down to the minimum.

Six standard 2½ in. Delfos jackhammer drills were used mounted on airlegs and operated from a drilling platform. This arrangement gave a 34 hole draground to give advance of 8 ft. per blast. A manifold drill carriage served the drilling platform as an independent unit. Drill steel is 1 in. hex. with a tungsten-carbide tipped drilling head of the chisel type and 9 ft. long.

The operational cycle, in minutes, for a shift was: Cleaning, 75; drilling, 55; face examination, 10; charge-up and blast, 10; re-entry, 30. Total 180.



A Granby type mine car in tilt position

Metallurgical Processes in Use at Mines of the Belgian Congo

This article is condensed from *Mineral Trade Notes*, Supplement No. 47, published by the United States Bureau of Mines, and is a translation of a descriptive summary of metallurgical processes used in the recovery of copper, zinc, cobalt and associated metals from Katanga ores, and of diamonds, tin and gold in other areas of the Belgian Congo.

Copper-zinc sulphide ores are supplied exclusively by the Prince Leopold mine at Kipushi. After beneficiation at the mine, the copper concentrates are smelted at the Lubumbashi smelter and the zinc concentrates are partly converted into electrolytic zinc at Kolwezi and partly exported. The ores also contain cadmium, germanium, silver, and lead. Monthly production is about 100,000 tons of ore.

After mining, the crude ore passes through a series of crushers followed by fine grinding in ball mills, which liberates the ore particles from the barren gangue minerals, and the copper sulphides from those of zinc. The pulp thus obtained is subjected to a series of selective flotation operations from which a copper concentrate with relatively little zinc, and a zinc concentrate with little copper, are produced. Research in the laboratory and plant has led to increased selectivity of the flotation operation.

In the Lubumbashi smelter the copper concentrates are partly desulphurized in three large Dwight-Lloyd sintering machines. The sinter, which still contains some sulphur, is smelted in the water-jacket furnace with coke imported from Southern Rhodesia. A small quantity of flux is added to form a fluid slag. Three products are produced, namely a slag containing almost no copper but rather high in zinc oxide, some cadmium, and germanium, which is stockpiled in granulated form for future treatment; fine dusts, which are cleaned in filter sacks and from which a fine powder containing some cadmium, germanium, zinc, and lead is obtained; and a copper matte containing 62 to 64 per cent copper and some iron and sulphur. The matte is cast into a reverberatory-type holding furnace, warmed by pulverized coal, then transferred by large cast-steel ladles into a converter 9 m. long and 4 m. in dia. and served by a 2,000 h.p. turbo-blower.

The air blown into the liquid matte under pressure burns the sulphur. The other impurities form a slag with a flux that is poured into the converter. The final product is blister copper (99 per cent), which is sent to Olen for refining, where the silver content also is recovered.

OTHER UTILIZATIONS

A large part of the zinc concentrates produced is sent to Belgian plants (about 120,000 to 150,000 tons a year), and the remainder to Jadotville where the concentrates are roasted in Spirlet furnaces to produce sulphurous gas, which is converted into sulphuric acid for use in processing oxidized copper and cobalt ore.

After roasting the concentrate contains zinc in the form of oxide, and is sent to the METALKAT zinc plant at Kolwezi. It is put into a sulphuric acid solution, its gangue is removed together with metallic impurities and it is submitted to electrolysis and an almost chemically pure cathode zinc is produced. These cathodes are melted in an electric furnace and cast into ingots, which are exported. Metallic impurities contained in the concentrate also are recovered—cement copper is smelted in an oscillating furnace, poured into ingots (99 per cent), then refined electrolytically at Olen, and the cadmium is refined electrolytically.

The mines in the Kolwezi region contain large tonnages of copper-cobalt sulphide ores for which special treatment

has been developed in Africa. These ores, after concentration by flotation, will be subjected to a sulphidizing roast, leached, and then treated electrolytically. This new metallurgy will require the construction of a large industrial plant to produce electrolytic copper and cobalt.

HYDROMETALLURGY OF ORES

Copper-cobalt oxide ores are mined from the Western Group (Musonoi, Kolwezi and Ruwe). Ores are beneficiated at the mine and then sent to Jadotville to be treated by a double electrolysis producing copper and cobalt.

The ores are too low grade (six per cent copper and 0.3 per cent Co.) for direct treatment in the electrolytic plant at the Kolwezi concentrator. After crushing and grinding the ore is floated, the reagent used being Congo palm oil after it has been treated in the Sogechim's plant at Jadotville to separate the fatty acids from the glycerine fraction. A concentrate containing 28 per cent Cu and one per cent Co is obtained. Monthly capacity of the concentrator is 250,000 tons.

The Ruwe mine uses a more simple process—the malachite, in grains ranging from a mm. to the size of the fist, is contained within a very soft clay which can be separated by being treated in log-washing equipment and then in jigs. The Kolwezi and Ruwe concentrates are sent to Jadotville for further treatment.

At the electrolytic plant the concentrates are mixed with an acid solution (sulphuric acid from roasting zinc concentrates) to dissolve the copper and the cobalt as sulphates. This operation is carried out in high cylindrical tanks with agitation by compressed air to expedite dissolution. The pulp thus obtained is cleared of solid material by rake classifiers, thickeners, and gravel filters.

The solution now containing only copper sulphate and cobalt sulphate is sent to a large tank house containing 160 cells, 19 m. long, 1 m. wide, and 1.25 m. deep, equipped with insoluble anodes of lead and copper cathodes. The acid radical (SO_4) reforms immediately from the sulphuric acid through a combination of the hydrogen in the water of the solution. The starting sheets (1 mm. thick) are obtained through a different electrolysis, beginning from soluble anodes of crude copper. At the end of four days these sheets have built up to 10 mm. and are melted in the refining furnaces and cast into commercial shapes. Annual capacity of the plant is 110,000 to 115,000 tons of copper.

TREATMENT OF COBALT

A watch is kept, through continuous removal of a part of the solutions from the copper circuit, that the tenor in cobalt does not exceed a certain limit, which would be bothersome for the copper electrolysis. This bleeding is treated in part through the removal of the copper then by electrolysis in a special tank house where it gives cobalt cathodes, which are then melted in the electric furnace and the liquid metal is poured in a thin stream into cold water where it is granulated. The capacity of the cobalt plant is 4,500 tons of electrolytic cobalt per year.

Certain ores, especially from the Western mines, contain relatively little copper. They are concentrated by palm oil

flotation up to a tenor of 8.5 per cent Co and 10 per cent Cu. Certain other ores contain virtually no copper and their physical nature (incrustations of cobalt mineral intercalated into the schists) lends itself to a simple concentration by log-washing. All these cobaltiferous products are smelted in the electric furnaces of Jadotville from which are obtained a white alloy with 45 per cent Co and 15 per cent Cu, which is sent to Olen to be refined by a chemical process and transformed into metal rounds or commercial salts; electrolytic copper produced from the cupriferous residue treated in the Olen copper plant; a red alloy (82 per cent Cu and 8.5 per cent Co) that is purified in a rotary thermal furnace and serves for preparing the soluble anodes for the Jadotville electrolytic copper plant, which are converted by electrolysis into starting sheets for the electrolytic cells.

This copper is thus finally converted into electrolytic copper. The slag from the rotary furnace, having collected all the cobalt from the red alloy, is returned to the cobalt electric furnaces. A slag, rich in lime, comes from the limestone flux mixed with the electric furnace charge. For two years this slag, thanks to its properties, has been used in a new plant near Jadotville, for the manufacture of cement of a quality equivalent to that of ordinary portland cement.

The annual capacity of the cobalt electric furnace plant is 4,000 tons of cobalt metal.

RECOVERY OF DIAMONDS

The exploitation of the diamond deposits is concentrated within two districts, relatively near to each other. The Ishikapa region on the Kasai is exploited by the Société Internationale Forestière et Minière du Congo (FOR-MINIERE). This zone extends into Angola. A zone near the preceding one is exploited by three small companies. The Bakwanga region, on the Bushimaie (Tributary of the Lubilash-Sankuru), is exploited by Société Minière du Bécéka.

The diamantiferous gravel is transported to a washer, a mobile unit that can be brought quite near to the working face. This mechanically driven washer progressively eliminates the waste material using trommels, large rotary pans, and piston jigs. The product of the piston jig is submitted to a new beneficiation through sink-and-float concentration, ferrosilicon being used as the heavy medium. The washer thus produces a hyperconcentrate containing the diamonds mixed with heavy mineral matter and quartz. This concentrate is sent to the central picking plant, where it passes through a magnetic separator, which removes the ferruginous materials, and then over grease tables, where the unique property of certain mineral greases is used to retain the diamonds, excluding all other bodies (quartz, etc.). When the tables are sufficiently loaded with diamonds they are recovered by hand picking or by melting the grease. Other processes are picking and classifying.

TIN MINING OPERATIONS

The ore cassiterite comes from primary vein sources and up to the present, the tin mining, with some exceptions, is confined to the exploitation of the alluvial and eluvial deposits.

Before the war, only gravels running 1.5 to 2 kg. of cassiterite per cu. m. were treated, but this has been progressively lowered to 1 kg. and to 300 to 500 gm. and even 150 gm. The barren overburden is attacked by monitors of 6 to 8 kg. pressure p.s.c., and the disintegrated ground flows through steep ditches towards the waste pile.

The Washer. This installation consists of a fixed screen separating the large barren pebbles; classifiers of the sluice

type, piston jigs, which reject a part of the waste and from which there is extracted a concentrate, then treated in the pulsating jigs operating according to an analogous principle. The product of these machines is finished cassiterite; the rejects still contain the very fine cassiterite and any accompanying minerals, such as, columbite-tantalite and wolframite. These rejects pass over shaking tables.

Separation is not always made in Africa, but in most instances at Hoboken, Belgium, where the cassiterite, before smelting, passes over magnetic separators.

In the field of tin, special mention must be made of the Géomines company at Manono. There the cassiterite is finely disseminated with a granitic host-rock, the upper portion of which, highly altered, can be removed on a large scale by electric shovels. Some eluvials from this rock have been treated, between 1919 and 1932, by rudimentary manual methods. The altered rock remaining in place was attacked, beginning in 1933, by powerful means: Electric shovels, belt conveyors, and large treatment units producing cassiterite with 74 per cent tin. However, Géomines has gone a step further. Its mechanization had led to the construction of a hydro-electric plant (at Piana, on the Luvua, 90 km. from Manono) the capacity of which included a surplus; so it was decided to use this to smelt the company's own cassiterite. Therefore two electric furnaces of 1,000 kW. were installed in (1934 and 1939), which operated at full capacity during the war and also treated the cassiterite coming from other Congo mines.

EXTRACTION OF GOLD

Mineralization of gold in the district presents a close analogy to that of tin, that is to say that the primary deposits (in quartz veins or in granitic rocks) have given place to eluvials and alluvials. However, the exploitation of the primary gold deposits, where the gold is not entirely free and is even partly contained in sulphide minerals such as iron pyrite, has called for other methods of treatment. The vein material is crushed and then ground in ball mills to the fineness desired to liberate as much of the free gold as possible. The free gold is recovered in the installation for amalgamation. The very fine gold and that which has remained combined with the heavy minerals or with the waste is recovered by cyanidation.

The pulp from the ball mills flows successively over coco mats, where the heavy particles are caught; amalgamation tables, silver-coated copper plates covered with mercury with which the gold forms an amalgam; and, corduroy tables, which recover more heavy minerals and any heavy minerals deposited on the coco tables are collected, then amalgamated in a special amalgamator where they are ground in the presence of mercury. The product is filtered, the overs from the screen being of amalgam.

The amalgam produced during these different operations is then distilled in a retort, where the mercury is volatilized and then condensed by cooling, to be used again. The solid residue from the distillation is the crude gold.

Extremely fine gold or that intimately associated with other materials is lost in the operations described above. This gold is recovered by cyanidation.

The pulp from the amalgamation section then goes to the cyanide tank where sodium cyanide is added, which combines with the gold to form a cyanide of gold. The pulp passes to a series of decanters, where the solids are deposited, to be removed from the bottom of these by special pumps and discarded while the solutions of gold cyanide overflow. This solution then goes into a precipitation tank where it is mixed with zinc dust; the zinc replaces the gold of the gold cyanide, and the precipitate is metallic gold.

British Steel Plans for Further Growth

STEEL EXPANSION CREATES SCARCITY VALUES

(From Our Iron and Steel Correspondent)

The duration and extent of the steel boom has confounded the prophets, and apparently it has not even yet reached its zenith. Following a rise in ingot production amounting to 1,250,000 tons last year the British steel industry has budgeted for a further increase of 1,500,000 tons in 1956, and in the first quarter the estimated annual rate of 21,300,000 tons has been easily exceeded.

The same story of rising production lagging in the wake of unprecedented demand is repeated in nearly every country in the world where steel is manufactured.

In the United States where crude steel production averaged 8,708,000 tons per month last year, the output was raised to the record figure of 10,850,000 tons in March and the rate of steel mill operations was between 99 and 100 per cent. All the indications are that more steel will be produced in the United States in 1956 than in any other year on record and current estimates are that the final figure will top the 120,000,000 tons mark.

SUPPLY STILL TIGHT EVERYWHERE

Yet still steel is tight and American experience is matched elsewhere. An increase of 13.5 per cent in March brought Canadian ingot production to a new monthly high level of 427,730 tons, and on the area covered by the European Coal and Steel Pool an aggregate output of 13,860,000 tons in the past three months was over a million tons better than the figures for the corresponding period of 1955.

Of greater significance than these impressive statistics of expanding production is the fact that the industry does not appear to be within measurable distance of equating supply and demand. In this country supplies are so short that makers are restricting exports to an approximate limit of last year's figures, and envisage the possibility that imports at least as large, and possibly even larger than last year will be required to meet the essential needs of the steel-using industries.

In these circumstances it is not surprising to learn that the long term plans of the steel industry are being re-examined. It is expected that in two years' time the total output of steel in this country will be almost double the output at the end of the war. Upon the adequacy of that rate of expansion there is a widening circle of doubt. Notoriously the planners have heretofore underestimated the extent of the home and export demand.

Moreover there are other considerations of which the industry must take cognisance in its deliberations. The continuing programme of expansion raises problems of management no less than of materials and equipment, and a report on management foreshadows central courses for managers from all sections of the industry to supplement the work done by individual companies.

ORE SUPPLIES

External events have invested with more immediate urgency the provision of adequate supplies of iron ore. This again is a problem which besets all or nearly all the major centres of steel production.

French North Africa normally provides 25 per cent of the foreign ore consumed in British blast furnaces. Of 12,800,000 tons imported last year 3,251,000 tons came

from this source. For the current year the industry's original ore import target was 14,800,000 tons compared with 12,900,000 tons last year, but it now seems unlikely that the import total will exceed 14,000,000 tons and to achieve that amount more liberal supplies will need to be bought and shipped from other sources.

This may be a difficult and a costly process. There is no lack of iron ore in the world but much of it is inaccessible, and development of new ore fields is a slow and a costly process. Chief consumer of the output of the new mining areas in Quebec and Labrador is U.S. steel, whose total intake of 24,000,000 tons of foreign ore last year was 50 per cent greater than in 1954. Venezuela is also contributing substantial tonnages to feed the hungry American blast furnaces, but smaller tonnages from both these sources have been purchased by B.I.S.C. (Ore) Ltd. which operates on behalf of all British blast furnacemen, and in the event it has proved a happy circumstance—or shall we say a heartening example of British foresight—that two important contracts were negotiated last year, one for a supply of Venezuelan ore starting this month, and the other for the shipment of concentrates from Liberia to be received from 1957 onwards.

Similar foresight has been displayed in the arrangements made last year for substantial additions to the fleet of controlled ore carriers. Nine new vessels specially built for this source are now in operation, others are on order and 13 converted oil tankers are also on time charter. Thus it is estimated that by 1959 the industry will have under its control sufficient shipping to carry about 9,000,000 tons of imported ore which is about 50 per cent of the total expected requirements.

But whether collectively or privately owned, the ore shipping fleet is not immune from the effects of rises in the freight market and it is estimated that the cost of foreign ore with a 55 per cent iron content delivered to the British blast furnaces is now well over £5 per ton, and as recently as December last pig iron prices were advanced to take account of an average increase of 10s. a ton in the price charged to consumers of imported ore. Other inflationary influences are the steady rise in wages, the growing cost of coal and oil fuel and stores, and lastly the further advance in railway freight rates which became operative on Monday, April 23, and added about 5s. per ton to the cost of crude steel production.

BRITISH ACHIEVEMENTS

As yet there has been no official indication of a further revision of steel prices, and in view of the Government's avowed intention to resist inflation, it may be that the steel industry may be left to carry the baby. It may be noted, however, that productivity per man hour has been substantially increased. Spectacular achievements in fuel economy have been made possible by improved techniques and British steel prices remain substantially below those of the other major steel producing countries. It remains to be added that the £80,000,000 contract for the construction of a large integrated steel plant in India by a consortium of British interests has been signed at last and although similar contracts were placed much earlier with German and Russian contractors, it is expected that the British built plant may be the first to attain full production in 1960.

Conveyor Installation in Canadian Mine

A concrete lined tunnel 3,445 ft. in length and a 3,800 ft. cable belt conveyor have been constructed and installed by Old Sydney Collieries Ltd., a subsidiary of the Dominion Steel and Coal Corporation Ltd. of Canada. The project was undertaken at Princess Colliery, Sydney Mines, in Nova Scotia, and in conjunction with a coal preparation plant previously put into operation, provides modern coal mining, transportation and preparation facilities at the Princess pit. The new development, described in the following article condensed from *Teamwork*, a monthly publication of the Dominion Steel and Coal Corporation Ltd., will double the output of Princess Colliery. Operation of the new tunnel and conveyor began on December 5, 1955.

The new tunnel-conveyor installation recently put into operation at Princess Colliery, Nova Scotia, will double the output of the colliery. It was evolved and planned by Dosco engineers, and provision was made for the mining and loading of coal by Dosco miners as well as for the transportation of the raw coal from pit bottom to a modern preparation plant by rubber belt conveyors.

Excavation of the tunnel itself was begun in the summer of 1951, the task becoming particularly challenging when quantities of water and sand encountered in the operations caused extensive damage to the machinery and equipment employed in driving. The tunnel, which is semi-circular in shape, is 18 ft. in dia. on 4 ft. leg, allowing for a height of 13 ft. at the centre of the arch. Some 43,300 cu. yd. of spoil were excavated during the construction, and roof bolting was used extensively as a support medium.

Within the tunnel, coal transportation is by the 42 in. wide cable belt conveyor, which was manufactured by Cable Belt Ltd. of Inverness, Scotland. The conveyor is 3,800 ft. in length and has a carrying capacity of 750 tons per hr. at a travelling speed of 400 f.p.m.

The principal advantage is the absence of tension on the belt itself. All pull is absorbed by the cables with the rubber in reality only saddling the load. A second advantage is that of the drive being by a single motor located at

the upper end. At Princess Colliery the 550 h.p. driving motor is therefore positioned on the surface.

The cable belt conveyor itself is set on one side of the tunnel while the other half of the excavation is equipped with a single track for conveyance of men and materials.

In the operation of the installation, the coal won reaches the tunnel bottom from the colliery's main deep level, and from that point runs to a near-level pit bottom landing. The loaded pit boxes are advanced progressively by a creeper and are fed at regular intervals to an electronically operated creeper and tippie. As the boxes advance, the coal is weighed and the weight recorded.

The tippie concerned in this operation was manufactured by the Wellman Engineering Co. and has a capacity of six cars per min. Indicative of the detail involved is the realization that the coal dust aroused when the tippie dumps the coal on the belt conveyor is recaptured from the air by a dust collector and is eventually deposited on the conveyor.

After the coal is pulled the vertical height of 693 ft., it is transferred to another belt which conveys the product directly to the preparation plant. In this plant unduly large sizes are first crushed and the coal is washed and separated by size gradings. After the coal has been oiled it is deposited ready for delivery to the consumer.



The Princess Colliery main tunnel

MACHINERY AND EQUIPMENT

Cargo Nets for Helicopters

Nylon nets suspended beneath helicopters have been employed successfully in Britain for transporting materials and equipment to construction sites in inaccessible districts. The technique saves valuable time and conceivably has applications within the mining industry in so far as the prospecting of inaccessible sites is concerned. The nylon net makes it easy to handle loads of practically any size or shape.

A company operating in Scotland airlifted approximately 250 tons of materials in this manner. About a quarter of a ton was carried on each lift. A smaller version of the net used in these operations recently has been displayed by British Nylon Spinners Ltd.

The net used in Scotland is octagonal with a diameter of 8ft. 6in. It has three-inch mesh constructed from $\frac{1}{4}$ in. circumference nylon rope with a breaking strain of 1,200 lb. The boundary rope is made from $1\frac{1}{4}$ in. nylon rope with a breaking strain of 3,200 lb. The net is secured to the helicopter by four leather covered straps attached to a bomb release type of lifting equipment operated by the pilot.

Nylon is used for the nets because its great strength and lightness in weight increases the payload. Each net has a safe working load of roughly half a ton but its total weight is only 22 $\frac{1}{2}$ lb. A net of comparable strength made from natural fibre would weigh 55 lb.; made from wire rope its weight would be about 160 lb.

Additional advantages are that nylon is very hard wearing and is immune to rotting, if it gets wet it does not need to be dried out. A nylon net is extremely easy to handle and remains completely flexible under all conditions, even when it is wet.

A New Design of Fan

With the introduction of the Tornado range of bifurcated fans in 1952, a new design of fan was brought successfully to bear on the problem of industrial fume removal. The design supersedes many conventional, direct driven axial fans, the motors of which were actually in the airstream. It obviates the need for other expensive axial fan arrangements such as V-rope or extended spindle drives and, at times, centrifugal fans used for removing obnoxious fumes from industrial processes.



The Tornado P.V.C. bifurcated fan

In brief, the bifurcated design of fan casing allows the easily accessible, direct driving motor to be completely isolated from, and therefore unaffected by, the fumes passing through the casing. This standard range is constructed with welded steel casing and cast silicon-aluminium impellers in sizes from 10 in. to 25 in. diameter. They are normally coated with a sprayed enamel finish but when working under more arduous conditions additional protection is given to the internal surfaces by a rubber covering or liquid plastic coating.

An inherent weakness in these finishes is the fact that they are only "skin" deep. The slightest penetration of the otherwise perfectly protective surface results in corrosive attack of the parent metal beneath, an unrestrained corrosion radiating from that point.

The use of solid, rigid P.V.C. has solved the problem. Bifurcated fans with solid P.V.C. casings and impellers have now been made available. They offer two particular advantages when handling corrosive fumes from an extensive list of chemicals, in that the solid material used overcomes the possibility of corrosive attack which might be experienced by a specially coated fan with a damaged surface, and that no special coating has the equivalent anti-corrosive properties possessed by solid, rigid P.V.C. material in such a wide field of chemicals.

Two additional advantages are that Tornado P.V.C. bifurcated fans are quieter in operation and comparable in price with the alternative, specially coated steelplate Bifurcated fans.

The new range is available in sizes from 10 in. to 19 in. The 10 in., 12 in., 14 in. and 16 in. fans are constructed in $\frac{3}{8}$ in. thick P.V.C. sheet and the 19 in. fan in $\frac{1}{2}$ in. thick, with $\frac{1}{2}$ in. thick flanges for all sizes. The single or three-phase, totally enclosed squirrel cage induction motors, made specially for fan application are used throughout the range. They are built strictly in accordance with BSS. 170/1939.

P.V.C. Bifurcated fans are recommended for handling fumes given off by the following representative list of chemicals, at temperatures up to 120 deg. F. The P.V.C. material is resistant, also, to the fumes from aqueous solutions of nearly all inorganic salts in all concentrations, up to 120 deg. F. These fans are supplied by the Blackman Export Co., Ltd.

A Vacuum Condenser Pump

Within its range air ballasting has made it possible to pump condensable vapours without contamination of the rotary pump oil and subsequent deterioration of vacuum performance. With the aid of the condensers manufactured by Edwards High Vacuum Ltd., vacuum systems operating at comparatively high vapour pressures can be evacuated without exceeding the vapour pumping capacity of the air ballast rotary pump. The condenser takes the bulk of the vapour pumping load and it is thus possible to handle high evaporation rates without increasing the size of the rotary pump beyond economic limits.

One comparatively small vacuum condenser pump has a water vapour capacity of about 15 lb./hr. (440 litres/min.) despite its compact dimensions. Generally the unit will be mains water cooled, but it is possible to use chilled water or industrial alcohol.

The growing appreciation of the importance of air ballast rotary pumps for dealing with condensable vapours has led to the development of auxiliary condenser equipment to permit recirculation of air in cases where it is undesirable continuously to inject fresh air ballast into the pump. A small condenser is fitted to the outlet of the pump and the air or gas passing through it supplies the air ballast entering the pump after the vapour component present has been condensed out.

The applications of this unit are where the discharge of oil mist usually associated with large ballast flows is undesirable and cannot conveniently be piped away; where it is desirable to collect the vapours being pumped (precious or noxious substances); and where it is desirable to use moisture-free air, or gases other than air, as ballast (usually because of a possible reaction between air or moisture and pumped vapour).

MINING MISCELLANY

The Okuyama Prefecture, Japan, has reported that a mine in Kawakimi has been found to contain a considerable quantity of uranium ore of good quality.

The work of re-opening the Naricual coal mines in Anzoategui State, Venezuela, which is being carried out by two German concerns, is now half completed and should be finished by 1957. Mining machinery has arrived from Germany.

It is reported from Venezuela that the Orinoco Mining Co. (U.S. Steel) has signed contracts for the supply of 1,000,000 tons of iron ore to both the U.K. and Germany during 1956. Japan will take between 80,000 and 100,000 tons. Shipping is now the main factor limiting sales to Japan and other areas.

The liquidator of the Mysore Gold Company states that a claim against the company in the liquidation for a very substantial amount has been presented by the Mysore Government and is now under examination. Early distribution of the balance of assets, which had been contemplated, has therefore been deferred.

Large copper and lead deposits are reported to have been found in the Belgian Congo near the frontier with Northern Rhodesia. Plans are said to have been made to establish two mines and capital available for the project is believed to be about £17,000,000, all supplied by a Belgian concern based in Elizabethville.

British Geon Ltd., a member of the Distillers' Group, has increased its productive capacity for Geon P.V.C. (polyvinyl chloride) to 27,000 tons a year by recently completed extensions to its factory at Barry, Wales. One of the largest uses for this product is in the manufacture of fireproof conveyor belting for coal mines.

Philippine mineral production during the fiscal year ending June 30, 1955, was valued at P148,659,399, an increase of P1,634,134 or 1.1 per cent over the previous twelve months. Base metals accounted for 42 per cent and gold and silver 31 per cent, the balance consisting of coal, cement and other building materials.

From Japan comes a report that a government research scientist has found a method of producing graphite from coal. Great importance is attached to the discovery, since it is estimated that if mass production could be applied to the process, graphite could be made for about ¥200,000 per ton—two-thirds of the current international price.

Chromite outcrops near Bawhyndyuku peak in the Zanidaw area are discussed by the Director of Geological Survey of the Gold Coast in his recently published report for 1953/54. Surface examination has shown nothing of economic significance, but the opinion is expressed that some drill holes would be worthwhile to provide more definite evidence, particularly of the variation with depth of the intrusive bodies.

The Atomic Energy Commission in the U.S. has announced the lifting of a ban, effective since 1953, on the use of its facilities for irradiation of gems. However, the Federal Trade Commission has adopted regulations making it illegal to sell "artificially coloured" diamonds. It seems that irradiation can change the colour of diamonds. If placed in a nuclear reactor, the diamond will turn green. The possibility exists that unscrupulous merchants might use irradiation to change the colour of cheap "yellow" diamonds by developing a method of changing them to resemble more closely the blue-white diamond.

The Geological Survey Department of Northern Rhodesia has published "Records of Geological Survey" for the year ending December 31, 1954. The section on economic geology includes notes on the tin deposits of the Choma district; the Kamiyobo copper prospect, Mumbwa district; and the dumps at the Sable Antelope Mine, Mumbwa district.

Camp Bird Ltd. have announced the formation of a new wholly-owned subsidiary company, Camp Bird Industries Ltd., whose function will be to ensure close integration of the growing number of industrial enterprises which this finance and mining house now controls. Mr. John Dalglish, head of Camp

Bird, will also be chairman of the new company. The managing director will be Mr. B. R. A. Homfray Davies.

PERSONAL

Sir Ronald W. Matthews, J.P., has intimated his decision to relinquish the chairmanship of the Brush Group Ltd., a position which he has held for sixteen years, but will continue as a member of the board. He is being succeeded as chairman by Mr. G. C. R. Eley, C.B.E., who was appointed deputy chairman of The Brush Electrical Engineering Co. Ltd. (now the Brush Group Ltd.) in 1953. Mr. Eley has been a director of the Bank of England since 1949 and his other business interests are wide.

Mr. L. W. Allen, manager of Rhokana Corporation, Ltd., has been appointed general manager of Nchanga Consolidated Copper Mines, Ltd., in succession to Mr. H. E. Nelems, who has accepted a senior appointment in a mining company in Canada. Mr. Allen takes up his position on June 1. Mr. G. S. Giles, at present Assistant Consulting Engineer in the Anglo American Corporation of South Africa, Ltd., Johannesburg, has been appointed manager of Rhokana Corporation, Ltd., in succession to Mr. Allen.

The Rt. Hon. the Viscount Downe, O.B.E., has been appointed chairman of the board of directors of Dolly and Palmer Ltd. Mr. W. H. Fleming (chief mining engineer) and Mr. D. M. H. Revill (chief mechanical engineer, mining division) have been appointed executive directors of the company.

Mr. Paul W. Litchfield has relinquished the post of chief executive of the Goodyear Tire and Rubber Co. and has been succeeded by Mr. E. J. Thomas, president of the company. Mr. Litchfield will continue as chairman of the board.

Mr. A. R. Neelands, chairman of the Cementation Company, returned to Britain a few weeks ago after a two-month visit to the company's African subsidiaries. He has now left for France and Italy, where he will attend board meetings of associated companies in the world-wide Cementation Group.

Mr. E. W. Colbeck, a director of the parent company, has been appointed managing director of Hadfields Steels Ltd. Major H. G. Freeman, a director of the parent company, has been appointed a director of Hadfields Steels Ltd. Other new members of the board of Hadfields Steels are Mr. J. F. Squire and Dr. J. R. Rait, both local directors of the parent company.

Mr. Vernon Young, director of International Combustion (Holdings) Ltd. and chairman of its subsidiaries, International Combustion Ltd., International Combustion Products Ltd. and Riley (IC) Products Ltd., died on April 18 after a short illness.

Mr. R. D. Millar has taken up his appointment as sales representative in the North-Western area of Sheepbridge Stokes Ltd.

The death has occurred of Mr. F. J. Hewitt, chief technical representative in England of Martin, Black and Co. (Wire Ropes) Ltd., Coatbridge.

Mr. I. S. Horabin has been appointed sales manager of Harold Andrews Sheepbridge Ltd.

The report for 1955 of the Professional Engineers Appointments Bureau, 9 Victoria Street, S.W.1, emphasizes the continued shortage of civil, mechanical and electrical engineers. In 1955 there was no significant change in the number of engineers registering with the Bureau but the number of vacancies notified increased by 20 per cent.

AGENCIES WANTED

Roberts McLean and Co. Ltd., 31 Netaji Subhas Road, Calcutta, are interested in securing the representation in India of U.K. manufacturers of crushing and screening plant, drag-scrappers, continuous weighers, magnetic separators, and 2- and 3-throw ram type pumps (belt operated). Manufacturers interested should write direct to this company. It will be appreciated if, at the same time, they would notify the U.K. Trade Commissioner, P.O. Box 9077, 1 Harrington Street, Calcutta 16, that they have done so. B.O.T. Ref.: ESB/21616/55. Telephone: Chancery 4411, Extension 776.

METALS, MINERALS AND ALLOYS

COPPER.—Premium priced copper in the United States has ended its daily run of falls although it is still inclined to weakness. Dealers and custom smelters' price for both May and June has come down to 47½ c. per lb with No. 2 scrap copper little wanted at 37½ c. Mr. Simon Strauss of American Smelting and Refining said this week, "If there is no interruption to production through labour or other difficulties then I look for some easing in the 46 c. producer price sometime in the future". This is like prophesying that unless something untoward happens the sun is likely to rise in the morning, but it emphasizes the important fact that for any further sizeable break in copper to take place the big American producers would have to take a part. It may well be that the producers would like to see a period of steadier prices before lowering their quotation to avoid any precipitate fall; nevertheless, the London price is substantially lower than the American price.

The general break raises two other matters. When copper shot to £437 it was said that R.S.T. could not fail to raise their price; now it seems equally likely that R.S.T. must soon lower its figure. R.S.T. is obviously anxious to avoid following the market rapidly even though its movements may be substantial but the downward trend is now firmly established and can hardly be ignored. The other test is whether the American mined Chilean metal will still be priced on London values now that they are lower than New York's; this is a matter of great significance for the L.M.E. Meanwhile, the U.S. Office of Defense Mobilization has announced that it will require less copper in the third quarter for defence and atomic energy needs.

Utah Construction and Morisson-Knudsen have signed an \$80,000,000 contract for building copper mining facilities around Toquepala, Peru. The contract for the Port of Ilo has already been awarded.

Kennecott Copper Corporation is to embark on a \$40,000,000 programme to extend the life and reduce production costs of its Ray Mines (Arizona) Division, the company president, Mr. Charles R. Cox, has announced. The programme is expected to result, by 1958, in a 20,000 ton increase in the Division's annual copper production. The present mining limits of the pit will be extended so that adjacent and deeper sections of the orebody can be mined. The programme also provides for the construction of a smelter to handle the output of the Division. Smelting of this output has heretofore been handled on a toll contract basis by a custom smelter.

It is reported from Salisbury that the World Bank has approved in principle the issue of a loan to finance the Kariba hydro-electric project. It is understood that a letter from Mr. Eugene Black, president of the Bank, to Lord Malvern has said that technical discussions on the loan can start immediately. Officials will shortly be leaving Salisbury for talks in London and Washington. Lord Malvern has added to this news that in view of the World Bank's acceptance a loan from Colonial Development Corporation would be "almost automatic".

LEAD.—Lead continued a steady market in the United States at 16 c. per lb. although consumer interest was never at any time impressive. During the past week the Government has accepted offers for the stockpile and it is expected that purchases will show a further rise this month. The possibility still exists that a continued weakness in London might attract metal across the Atlantic and force the New York price downward. The American producers do not seem unduly worried by the prospect. For the time being they will be able to dispose of much greater tonnages to the stockpile and they are also looking forward to an early revival of buying from the battery producers. The automobile makers are said to be preparing to bring out their 1957 models in September and for this the battery makers must also advance their buying schedules slightly. Furthermore, it seems definite that the 1957 models will be really new and sales prospects are considered to be good. The lead producers are not, therefore, too concerned and believe themselves capable of holding on till commercial demand picks up.

In a speech to the American Zinc Institute, Mr. Felix Wormser, Assistant Secretary to the Interior, made the popular statement that "the general principle of giving moderate protection to a domestic industry when it faces injury from falling prices appeals to me. A reasonable import tax, applied to lead and zinc would help maintain mining operations for both defence and commercial purposes and yet permit all needed imports. It should serve to give the domestic producer a slightly larger price than that of the world markets, and at the same time impose little penalty on the foreign producer selling in United States markets".

What was interesting was that Mr. Wormser did not criticise

stockpiling, as the industry has done, for bestowing benefit on Americans and foreigners alike. Yet he assumed that stockpiling purchases "must cease" and that something else must replace it. Why? What makes Mr. Wormser's categorical and unargued statements so puzzling is that he went on to discuss the barter of American farm produce for foreign lead and zinc, saying: "The important significance to the mineral industries is that these programmes to dispose of agricultural commodities can serve to lift surplus stocks of minerals and metals from the international markets, and thus bring about higher prices". But while conventional stockpiling "must cease", these stockpile goals "are bound to be high, and purchasing and bartering could go on for years". Perhaps it is too much to expect any logic in American minerals policy; but at least it is worth noticing that approval of tariff increases is creeping inside the Administration and that stockpile goals for lead might well be reached by next spring.

Mr. Jean Vuillequez, of American Metal, said at the same meeting that in the next ten years an increase of 20 to 25 per cent in the free world's use of lead was necessary.

TIN.—In New York tin has been a quiet and featureless market although the price for spot Straits metal has not moved markedly lower; it has in fact fluctuated between 98½ and 99 c. per lb. In London the difference between cash and three month metal has virtually disappeared. In the circumstances consumers on both sides of the Atlantic are keeping their buying down although the main canning season is now approaching. Stocks appear to be reasonably good because the trade is ignoring a number of factors. The Middle East—though quieter than for weeks past—is still in unrest; the Russians' visit to Britain has not been an unqualified success; and the talks in London on the future of Singapore have opened in a far from hopeful atmosphere largely because of the Ceylonese election results and the growing intransigence of the Chinese population of Singapore.

The O.D.M.'s report to the President on the future of the Texas smelter has been published. It is a cogently argued document against the retention of the smelter. It is also interesting in that it rejects, except for some special reasons such as defence or foreign relations, the idea of a subsidy for private enterprise to operate the smelter. It would be possible to sell it at a knock-down price in 1957 when the elections are over; but the possibility also exists that it might be dismantled.

The dispute between the Malayan Mining Employers' Association and the Malayan Mining Employees' Union will be heard at arbitration at Ipoh on May 1. The president of the industrial court will be sole arbitrator.

Malayan output of tin-in-ore in March was 5,454 tons. This compares with 4,635 in February and 5,189 in March, 1955.

ZINC.—Zinc has been quiet but steady in the United States at 13.50 c. per lb. East St. Louis for prime western grade. A request for metal for the stockpile has been made and it is expected that the tendency to offer larger amounts will be continued. Latterly, however, a rather better demand for special high grade zinc, which has been in the doldrums, has appeared. The producers seem quite assured that they will be able to hold the present level till a genuine pick-up in demand comes along. For instance, Mr. Vuillequez, of American Metal, speaking at the American Zinc Institute meeting, said: "So far this year the automobile industry in the United States is producing substantially less than last year. Residential building here may fall slightly below 1955. However, there should be at least a partial offset to these reductions in output from additional capital investment for plant and equipment and from a discernible increase of inventories by manufacturers. . . . The use of zinc per car in die castings increased in 1956 models, at least partly offsetting the decline in new car production. . . . There should be a close balance of supply and requirements of slab zinc. As you know Washington is still interested in stockpiling additional quantities of lead and zinc. This programme may continue to act as a market stabilizer". Finally, in a defence of zinc's vital outlet in diecasting, he said: "The purchaser of aluminium die castings is taking the risk of a volatile and wildly fluctuating scrap market. Zinc is the dependable, relatively stable metal, not aluminium".

ALUMINIUM.—Reduced production of primary aluminium by Quebec smelters as a result of curtailed power was again reflected in Canada's export statistics for February, which showed shipments to other nations to be substantially lower not only than the January figures, but also than the average monthly figures during the final quarter of 1955. Of the 35,269

s.tons shipped during February, 19,599 tons went to the U.K., which is the largest export market for Canadian metal, but this amount was down by nearly 7,000 tons from January and 5,000 tons from December. A resumption of the upward trend in production, resulting in rising shipments, can now be expected. Alcan has put a new potline into production at Kitimat, which will raise production there by 2,500 tons monthly when operating at full capacity. In addition, full production has been resumed at Alcan's smelters, in Quebec, where power shortages due to drought have restricted output since last autumn. Now, with the spring break-up under way in the Northern Quebec smelters, the reservoirs of the hydro-electric system are being replenished. Meanwhile Alcan has a backlog of deferred deliveries which doubtless will gradually be overtaken.

TUNGSTEN.—According to the Bureau of Mines, consumption of tungsten concentrates in the U.S. increased last year by 122 per cent over 1954, the figure of 4,480 s.tons being the highest for any year since 1951. From less than 1,500 s.tons in 1949, domestic production has increased each year by an average of more than 1,000 tons, the 1955 output of 7,834 tons representing a gain of a further 19 per cent. General imports of tungsten ore and concentrates into the U.S. at 10,367 tons (tungsten content) were 10 per cent lower than in 1954. Although concentrates were received last year from 22 exporting countries, nine countries—Bolivia (22 per cent), Korea (12 per cent), Portugal (9 per cent), Canada (9 per cent), Australia (8 per cent), Brazil (6 per cent), Belgian Congo (6 per cent), Spain (5 per cent) and Peru (5 per cent)—supplied 82 per cent of the total. At the end of the year industry stocks amounted to 2,062 tons against 2,185 tons at the end of 1954. Domestic tungsten concentrates were purchased by the U.S. Government during the year at a basic price of \$63.00 per s.ton unit in terms of the Domestic Tungsten Programme. General Services Administration announced delivery of 2,379,975 s.ton units of WO₃ as of December 31, 1955. Under the present programme, purchase of 3,000,000 units is authorized.

Manufacturers of tool steel consumed 15 per cent of the tungsten concentrates used in the U.S. in 1955. However, new alloys that promise to be very suitable for jet aircraft and other ultra-high temperature uses are being developed under the auspices of the Tungsten Institute and are to be tested by two of the larger manufacturers of aircraft jet engines. This field of application, if it can be successfully developed, might well constitute a valuable new outlet for the tungsten industry.

In London the market for tungsten ores still remains broadly in equilibrium, with prices tending slightly upwards at the present time.

URANIUM.—Facts given by Russia's foremost atomic expert, Igor Kurchatov, in his address at Harwell this week, have convinced British scientists that the U.S.S.R. is on the threshold of controlling the energy of the hydrogen bomb for peaceful uses. Dr. Kurchatov's revelations suggest the possibility that thermonuclear reactions might be turned to peaceful uses much sooner than was generally believed. It would appear, however, that Russian experiments in controlling the fusion reaction are not yet sufficiently advanced to warrant reassessment of the long-term market prospect for uranium, thorium and lithium as sources of future power. It may well be that the fusion reaction, if it can, in fact, be controlled, will supplement rather than replace the energy derived from nuclear reactors.

RARE EARTHS.—Rare earths elements show great promise as catalysts in the production of high-octane petrol and other petrol-chemicals. At a meeting of the American Chemical Society, an international catalytic authority, Dr. Vasilii I. Komarevsky, said that rare earths might also affect chemical reactions producing synthetic rubber and plastics, and that possibly they might be important catalysts in many other reactions. Because of recent developments in the production of titanium and because of the activities of the Atomic Energy Commission, the rare earth elements are being transformed into readily available materials. They are essential by-products of atomic piles, besides being closely associated with titaniferous minerals.

The London Metal Market

(From Our Metal Exchange Correspondent)

Over the week-end the expected reaction took place to last week's fall in the copper price, but contrary to most people's expectations it turned out to be of a very minor nature and on Tuesday afternoon and Wednesday the fall continued. The failure of the reaction to gain momentum indicates that a further substantial fall in prices is likely to take place, and people now expect the American custom smelters to reduce

their price to 46 c. per lb., and the further development of the market will then depend upon whether the primary producers commence to reduce their price. Another factor which will have to be considered is the level to which the R.S.T. reduces its price when the next alteration is made.

The tin market has again been featureless, with a routine demand continuing on both sides of the Atlantic and the price level being slightly affected by the weakness in other metals. On Thursday morning the Eastern price was equivalent to £768 per ton c.i.f. Europe.

The offtake of lead continues to be unsatisfactory, with the result that more selling has taken place on the market during the last week and there has been a substantial reduction in the price level after the shortlived rise which took place over the week-end in sympathy with the movement in the copper price.

The decline of about £2 in the price of zinc is due more to the general trend than to weakness in the metal itself, as consumption continues at a good rate with a satisfactory offtake for all grades of metal. If, however, the general price level of metals continues to fall it is not expected that zinc will be able to withstand this general movement, although proportionately its fall will probably be less.

Closing prices and turnovers are given in the following table:

	April 19		April 26	
	Buyers	Sellers	Buyers	Sellers
Copper				
Cash.....	£363	£364	£350	£350½
Three months.....	£357	£357½	£344½	£345
Settlement.....		£364		£350½
Week's turnover.....	7,325 tons		8,050 tons	
Tin				
Cash.....	£761	£762	£749	£750
Three months.....	£756	£757	£748	£749
Settlement.....		£762		£750
Week's turnover.....	1,225 tons		605 tons	
Lead				
Current half month.....	£113	£113½	£110½	£111
Three months.....	£112½	£113	£110	£110½
Week's turnover.....	3,975 tons		5,150 tons	
Zinc				
Current half month.....	£98	£98½	£96	£96½
Three months.....	£96½	£97	£94½	£95
Week's turnover.....	5,150 tons		7,175 tons	

OTHER LONDON PRICES—APRIL 26

METALS

Aluminium, 99.5%, £189 per ton	Nickel, 99.5% (home trade) £519 per ton
Antimony—	Osmium, £24/27 oz. nom.
English (99%) delivered, 10 cwt. and over £210 per ton	Osmiridium, nom.
Crude (70%) £200 per ton	Palladium, £8 0s./£8 10s. o.z.
Ore (60% basis) 23s. 6d./24s. 6d. nom. per unit, c.i.f.	Platinum U.K. and Empir.: Refined £34 0s. o.z. Imported £38 0s./£39 0s. o.z.
Bismuth (min. 1 ton lots) 16s. lb. nom.	Rhodium, £40/£42.
Cadmium 12s. 0d. lb.	Ruthenium, £16/£18 oz.
Chromium, 6s. 11d. lb.	Quicksilver, £85 ex-warehouse
Cobalt, 21s. lb.	Selenium, 112s. nom. per lb.
Gold, 249s. 3½d.	Silver, 78½d. f.o.z. spot and 78½d. f.d.
Iridium, £29/31 oz.	Tellurium, 15s./16s. lb.
Manganese Metal (96%-98%) £269 according to quantity	
Magnesium, 2s. 4d. lb.	

ORES, ALLOYS, ETC.

Bismuth	50% 7s. 3d. c.i.f.
Chrome Ore—	40% 6s. 3d. lb. c. f.
Rhodesian Metallurgical (semi-friable) 48% ..	£15 15s. 0d. per ton c.i.f.
Refractory 45% ..	£14 15s. 0d. per ton c.i.f.
Smalls 42% ..	£12 15s. 0d. per ton c.i.f.
Magnesite, ground calcined ..	£28 0s./£30 0s. d/d
Magnesite, Raw (ground) ..	£21 0s./£22 0s. d/d
Molybdenite (85% basis) ..	8s. 2½d. nom. per lb. c.i.f.
Wolfram and Scheelite (65%) ..	265s. 0d./270s. 0d. c.i.f.
Tungsten Metal Powder (98% Min. W.) ..	21s. 0d. nom. per lb. (home)
Ferro-tungsten (80%-85%) ..	18s. 0d. nom. per lb. (home)
Carbide, 4-cwt. lots ..	£39 3s. 9d. d/d per ton
Ferro-manganese, home ..	£59 10s. 0d. per ton
Manganese Ore Indian Europe (46%-48%) basis 125s. freight ..	102d./105d. per unit c.i.f.
Manganese Ore (43%-45%) ..	97d./98d. per unit c.i.f.
Manganese Ore (38%-40%) ..	90d./92d. per unit
Brass Wire ..	3s. 4½d. per lb. basis
Brass Tubes, solid drawn ..	2s. 9½d. per lb. basis

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

The recovery of the gilt-edged market received a check from the announcement of a £250,000,000 funding loan. This is represented by a 3½ per cent. stock, long dated and issued at 81 per cent.

Kaffirs had a much better week. Chart readers believe that the graph indications show that the market reached bottom early in 1956 and may now be on the way up. Finance houses generally moved upwards due to quiet buying on a market short of stock. Individual Rand mines were affected by the spate of news that came in during the week. The most interesting result was a borehole value of 3,935 in. dwt. on deflection, on the Zandpan property in the Klerksdorp district. Companies mainly interested in this area are Middle Witwatersrand, Vaal Reefs and Western Reefs. Shares of these companies all went ahead strongly. Vaal Reefs have also arranged for a loan of £2,100,000 from Anglo American Corporation who have the right to take up half a million shares at 35s. In addition, Hartebeestfontein which borders the area, were favoured. The company has produced excellent quarterly returns with 90 per cent payability and the mechanical sorting appears to be a great success. Buffelsfontein were another good feature showing 100 per cent payability over a limited development area. The Vogelstruisbult Gold Mining quarterly results disclosed no reason for the recent weakness of the shares. West Driefontein again recorded 100 per cent payability but there was little interest in the stock.

In the Orange Free State section, prices followed the general upward movement. Middle Witwatersrand and Orange Free State Investment Trust were good spots and Free State Geduld outstanding. Results from the rich southern area of the property are expected to come in later this year. There was also a market rumour that Freddie Consolidated had at last disposed of their interest in this company. President Brand reported that the fire at the mine was believed to be out, and

St. Helena's results were considered encouraging. The returns from Welkom recorded a steady improvement and ore reserves are now above the current milling values.

In the West African market, the Ashanti report was much as expected. Underground development from the Eaton Turner shaft is being pushed ahead and the company will probably mine richer ore to offset losses caused in the recent strike and here again underground developments from the 20th level are most important in considering the future of the property.

In the miscellaneous gold market, there was little of interest apart from the news that the nationalisation of the Indian mines is likely to take place in June. Compensation is being discussed. A large claim by the local government against the Mysore mine has held up the proposed capital distribution.

Coppers were generally better following the steadier metal price. News that Rio Tinto propose to go ahead unreservedly with the Mary Kathleen uranium project caused a rise in the shares.

There were few major price movements among tin issues but Tekka Tin and Rambutan propose to make capital repayments of 5s. and 7s. 6d. respectively. Kennecott Copper which is interested in Nigerian columbite are actively seeking markets for the mineral in the United States and the chairman of Bisichi reported that the company has sold 265 tons of the mineral at an average price of over £1,700 per ton during the current year. This should prove encouraging news for all columbite producers.

Barriers attracted more interest and shares in the group rose with the exception of Mount Isa which fell back due to the lower copper price.

Canadian shares were generally harder but suffered some profit-taking in sympathy with this trend on Wall Street.

Finance	Price April 25	+ or - on week	Rand Gold contd.	Price April 25	+ or - on week	Diamonds and Platinum	Price April 25	+ or - on week	Tin (Nigerian and Miscellaneous) contd.	Price April 25	+ or - on week
African & European .. .	2½	+½	W. Rand Consolidated .. .	35/-		Anglo American Inv. .. .	9½	+½	Gold & Base Metal .. .	1/7½	
Anglo American Corp'n.	7½	+¼	Western Reefs .. .	30/3	+9d	Casts .. .	25/-	+6d	Jantar Nigeria .. .	5/7½	
Anglo-French .. .	19/3		O.F.S. Gold			Cons. Diam. of S.W.A.			Joe Tin Area .. .	1/6	
Anglo Transvaal Consol.	30/3		Freddies .. .	7/10½	+¾	De Beers Defd. Bearer .. .	5½	+¾	Kaduna Prospectors .. .	1/6	
Central Mining (£1 shrs.)	38/6	+1/9	Freddies Consolidated .. .	4/-	+¾	De Beers Pfd. Bearer .. .	15½	+¾	Kaduna Syndicate .. .	2/4½	-14d
Consolidated Goldfields	54/3	+6d	F.S. Geduld .. .	4½	+¾	Pots Platinum .. .	12/4½	+¾	London Tin .. .	9/9	+14d
Consol Mines Selection.	33/9	+1/3	Geoffries .. .	13/3	+1/9	Waterवाल .. .	20/-		United Tin .. .	1/4½	
East Rand Consols	2/3		Harmony .. .	25/6	+1/9	Copper			Silver, Lead, Zinc		
General Mining .. .	3½	+½	Lorraine .. .	5/9	+6d	Bankcroft .. .	45/6	-14d	Broken Hill South .. .	59/-	+6d
H.E. Prop.	27/1	+14d	Lydenburg Estates .. .	17/3	+1/1	Chartered .. .	75/-	+6d	Burma Corporation .. .	5/1½	+44d
Johannes .. .	37/1	+1/6	Merrispruit .. .	10/3	+¾	Esperanza .. .	3/9	+44d	Consol. Zinc .. .	56/6	+2/6
Rand Mines .. .	3½		Middle Wits .. .	13/6	+¾	Messina .. .	9½xd		Lake George .. .	15/1½	+14d
Rand Selection .. .	38/9	+74d	Ofists .. .	56/6	+5/9	Nchanga .. .	15	+½	Mount Isa .. .	17/9	-2/1½
Union Corporation .. .	35/3	+¾	President Brand .. .	59/4½	+1/10½	Rhod-Anglo-American .. .	5½		North Broken Hill .. .	45/3	+1/-
Vereeniging Estates	4½	+¾	President Steyn .. .	31/-	+¾	Rhod. Katanga .. .	2/6		Rhodesian Broken Hill .. .	11/10½	+¾
Wits .. .	33/9	+1/10½	St. Helena .. .	26/3	+2/6	Rhodesian Selection .. .	50/6	-6d	San Francisco Mines .. .	25/3	-¾
West Wits .. .	36/3	+¾	Virginia Ord. .. .	11/-	+1/6	Rhokana .. .	40½	+¾	Uruwira .. .	5/7½	+¾
			Welkom .. .	21/9	+2/3	Rio Tinto .. .	3½	+¾			
			Western Holdings .. .	3½	+½	Roan Antelope .. .	28/1½	-¾	Miscellaneous		
						Selection Trust .. .	4½	+¾	Base Metals and Coal		
						Tanks .. .	8½xd	+¾			
						Tharsis Sulphur Br. .. .	5½	+¾	Amal. Collieries of S.A. .. .	53/1½	
									Associated Manganese .. .	42/6	
									Cape Asbestos .. .	9/9	+¾
									C.P. Manganese .. .	35/-	
									Consol. Murchison .. .	55/-	-5/-
									Natal Navigation .. .	3½	+2/6
									Turner & Newall .. .	109/6	
									Wankie .. .	16/7½	+¾
									Witbank Colliery .. .	4½	

COMPANY NEWS AND VIEWS

Ashanti's Eaton-Turner Shaft

Although first priority in future development will be given to equipping Ashanti Gold Fields Corporation's Eaton-Turner Shaft, so much time was lost through the recent strike of Africans that it is doubtful whether this work can be completed before September 30, 1956. Development at the bottom of the mine will therefore be delayed.

Prior to the strike it was intended to increase output for the current year to 18,000 oz. of gold monthly from 25,000 to 26,000 tons milled. But in view of the serious loss of production incurred, plans are now being made to mine a larger proportion of high-grade ore in order to retrieve the position. This policy is considered fully justified under the circumstances, and if carried out over a limited period will not seriously affect the mine's resources.

"Uncertain" Future for Bibiani

The consulting engineer's report for Bibiani (1927) in respect of the year ended September 30, 1955, describes the outlook for the mine as "uncertain". Except for the South orebody, no new ore had yet been located below No. 12 level. But information gained so far from limited exploration north of the Central Shaft on Nos. 15 and 18 levels—although not conclusive—does encourage the view that a major orebody is likely to be developed on these horizons.

It has become most urgent, the report continues, that exploration in depth should be accelerated. The immediate programme was to develop Nos. 20 and 21 Levels on the South shoot and to drive northwards on No. 24 Level. Inevitably delayed by the recent strike, this work is now being given priority over all other development.

Outlook for Gold Coast Main Reef

In his statement to shareholders of Gold Coast Main Reef, Major General W. W. Richards, the chairman, reminded shareholders of the urgency attaching to sinking the Bondaye main shaft and to exploration work at greater depth which this would make possible. The 20th level, he said, had been reached in November, 1955, when driving and crosscutting started. But the strike of African workers had delayed this vital work at a point within a few hundred feet of the reef. Driving and crosscutting had been resumed as expeditiously as possible in March this year, and news of the first results were being anxiously awaited.

Stressing the importance of 20th level exploration, General Richards said that if payable reef came in again at greater depth, the mine's future would hold every prospect of a gradual return to the satisfactory position of former years. But if the reverse proved to be the case, prospects would be grave.

Bisichi's Forward Columbite Sales

In his statement to shareholders of The Bisichi Tin Co. (Nigeria), Mr. W. J. C. Richards, the chairman, stated that a total of 265 tons of columbite had been sold forward in respect of the current year ending December 31, 1956, at an average price of £1,716 a ton. A more widespread consumption of columbite, he said, had prevailed at lower prices established since U.S. stockpiling ceased and the company had, therefore, refrained from contracting to sell all its estimated production so that demand could be met as it arose. At present, Bisichi was selling at a satisfactory profit, and Mr. Richards saw no reason to change his opinion that production of the metal was becoming a long-term source of profit.

Since the end of the past financial year, the company had agreed to purchase further properties in Nigeria. This would augment present ore reserves and lengthen its life potential. The question of providing finance for developing these properties was being considered.

Anglo American Will Lend Vaal Reefs £2,150,000

The Anglo American Corporation of South Africa have undertaken to provide Vaal Reefs Exploration and Mining Company with fluctuating loan facilities up to a total of £2,150,000. This loan will bear interest at 6 per cent per annum on amounts drawn and will become finally repayable on December 31, 1961. In consideration for these facilities

Anglo American have been granted the right to subscribe for 500,000 Vaal Reefs' ordinary shares at a price of 35s. per share. This right is to be exercised in whole or in part on or before July 1, 1958.

Besides enabling it to draw upon loan facilities as and when required, and to repay borrowings over a period of years, these arrangements make the payment of dividends an earlier possibility than would otherwise have been the case.

Dominion Reef's March Quarterly

A profit of £185,965 was made by Dominion Reefs (Klerksdorp) during the three months ended March 31, 1956. This compares with £210,897 during the previous quarter ended December 31, 1955. It is stated that on March 31, 1956, an amount of £74,601 was repaid on account of capital and interest in respect of uranium project loans. Of this amount, £55,590 was on account of capital and £19,011 for interest payments. The sum of £74,601 is the quarterly instalment to be paid during 1956 and will be subject to adjustment at the end of the year in the light of any further drawings which may be made on loan account.

As it will be some time before indicated reserves of payable ore underground can be developed, proved, and mined at the necessary rate, it has been decided to limit, for the present, overall quantities of slimes fed to the uranium plant—both from dump and underground—to 40,000 tons per month.

Zams to Make 1 for 20 Rights Issue at Par

With the recommendation of a final dividend amounting to 13½ per cent on its issued ordinary capital of £908,559, Zambesia Exploring Company's total distribution in respect of the year ended March 31, 1956, totals 17½ per cent. Owing to a change in the year end from December 31 to March 31 the previous financial period covered 15 months instead of the customary 12. Distribution on the smaller issued capital of £865,333 in respect of this period at 22 per cent was equivalent to 17.6 per cent for 12 months. Zams has thus virtually maintained its dividend on the increased capital.

Following C.I.C. consent the company intends to make a further rights issue to its shareholders. Accordingly, an amount of £45,429 of unissued share capital will be offered at par to stockholders in the proportion of 1 unit for every 20 held.

Although preliminary profit figures which appear in the table below indicate a considerable fall in total net profits from those of the previous financial period, two important considerations must be borne in mind. Firstly, during the fifteen months ended March 31, 1955, profits were very high due to an exceptional level of dividend income received. Additionally, the fact that one set of accounts cover fifteen months and the other only twelve must be borne in mind.

	Exploring Company £	Investment Company £	Total £
Profit before Taxation			
1954/5*	195,444	112,827	308,271
1955/6	68,820	121,665	190,485
Taxation†			
1954/5*	84,986	53,620	138,606
1955/6	43,827	57,732	101,559
Net Profit			
1954/5*	107,500	59,207	166,707
1955/6	22,114	66,915	89,029
Dividend			
1954/5*	107,733	Nil	107,733
1955/6	91,428	Nil	91,428
Carry Forward			
1954/5*	44,879	162,782	207,661
1955/6	28,444	226,715	255,159
Reserves			
1954/5*	394,879	162,782	557,661
1955/6	328,444	277,388	605,832

* 15-month period † Including adjustment for previous years

Zam's principal interests include a very substantial stake in Tanganyika Concessions held through its subsidiary, Zambesia Investment Company and an interest in Kentan Gold Areas and Rhodesia Katanga through its 50 per cent participation in Tanganyika Holdings.

Meeting, London, June 27.

Gold Fields Australian to Repay 2s. a Share

As the net current assets of Gold Fields Australian Development Company are considered to be in excess of requirements, a repayment of capital amounting to 2s. a share has been recommended. Resolutions for this proposal will be submitted at an extraordinary general meeting to be held on May 24.

During the year ended December 31, 1955, group profit rose to £35,636 from £19,647. This figure was struck after providing £10,567 (£8,283) for depreciation of fixed assets. After bringing forward accumulated debts of £47,360, a group loss of £11,724 remained to be carried forward.

A particularly interesting statement was made in respect of Mount Ida mine. While this property continues to earn satisfactory profits, development results have confirmed that no extension of the orebody can be expected. Future mining must, therefore, be regarded as a salvage of existing ore reserves. These are estimated at 100,000 tons averaging 9.14 dwt. of gold per ton.

Rich Zandpan Borehole Results

The Zandpan Gold Mining Co. has announced that 3,935 in. dwt. have been obtained from a first deflection in its borehole Z6 which intersected the Vaal Reef at 7,212 ft. Core recovery was complete. The original borehole yielded only 99 in. dwt. at the same depth although core recovery was not complete.

South Crofty Pays 7½ Per Cent

After a lapse in payments since 1952, South Crofty is to make a distribution of 7½ per cent on its issued ordinary capital of £117,000 in 5s. shares in respect of the year ended December 31, 1955. Group profit totalled £37,861 compared with a previous loss of £25,011. Mr. T. Pryor is chairman. Meeting, Cornwall, May 23.

SMELTER SUPERINTENDENT Required for 5,500 kVA, electric copper smelter near Jinja Township, Uganda, British East Africa. Applicants should be fully experienced in copper smelter operation consisting of electric furnace, converters, etc. Three year contract offered with married accommodation, passages and allowances. Good working and climatic conditions. Top salary for successful candidate. Apply with fullest details as to experience, references, personal data, etc., to General Manager, Kilembe Mines Limited, P.O. Kilembe, Uganda, British East Africa.

GOLD COAST LOCAL CIVIL SERVICE

INSPECTOR OF MINES

Qualifications: Degree or Diploma in Metalliferous Mining or a School of Mines or similar qualification together with at least three years' practical mining experience underground.

Duties: Inspection of Mines; enforcement of mining regulations and safety measures; responsibility for carrying out Miners' Ordinance and Regulations; maintenance of official records.

Terms of Appointment: On contract for two tours (18-24 months each) with salary in the scale £1,130-£2,020 p.a. plus gratuity. Outfit allowance. Furnished quarters at rental. Free passages officer and family. Free medical attention. Generous leave. Income tax at local rates.

Apply to Director of Recruitment, Colonial Office, London, S.W.1, state age, qualifications and experience, quote BCD 99/13 03.

AGENCE MINIÈRE ET MARITIME S A

2, RUE VAN BREE — ANTWERP — BELGIUM
Sworn weighers, samplers of ores, metals and residues.
Agents for shippers at European ports and plants.

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Mine Returns

AUSTRALIAN GOLD

Company	4 weeks to March 20 1955		4 weekly period since year-end	Current Financial Year Total to date		Last Financial Year Total to date	
	Tons (000)	Yield (oz.)		Tons (000)	Yield (oz.)	Tons (000)	Yield (oz.)
Central Norseman	12.1	5,056	13	170.4	92,163	157.9	82,980
Gt. Boulder*	105.2	26,296	3	105.2	26,296	108.2	24,902
G.M. of Kalgoorlie	40.7	10,796	13	494.5	128,417	240.8	64,540
Gt. Western Cons.	40.1	6,319	13	452.7	65,991	421.0	56,713
Morning Star	0.8	372	13	15.4	5,089	320.0	10,463
North Kalgoorlie	27.9	5,540	3	83.7	16,747	71.8	17,155
Sons of Gwalia	9.1	1,988	3	15.4	4,012	27.2	5,088

* Quarterly.

a Including 1,007 oz. from concentrates.

INDIAN GOLD

Company	March 1956		Months since year-end	Current Financial Year Total to date		Last Financial Year Total to date	
	Tons (000)	Yield (oz.)		Tons (000)	Yield (oz.)	Tons (000)	Yield (oz.)
Champion Reef	15.4	4,919	3	46.4	15,564	45.0	16,062
Mysore	18.9	4,837	3	55.4	15,169	49.5	15,458
Nundydroog*	21.2	6,137	3	55.2	14,798	53.6	14,466

* Current ore and old tailings

MISCELLANEOUS GOLD

Company	March 1955		Months since year-end	Current Financial Year Total to date		Last Financial Year Total to date	
	Tons (000)	Yield (oz.)		Tons (000)	Yield (oz.)	Tons (000)	Yield (oz.)
Br. Gov. Consol*	119.8	1,169	3	459.1	3,403	455.7	4,872
Clutha River*	195.0	350	12	3082.0	5,556	2904.0	5,947
Frontino	11.5	6,019	3	34.1	23,188	34.7	18,170
Kentian (Geita)	20.0	3,360	9	197.9	30,330	202.3	30,926
New Gu. G'fields	3.5	1,689	6	21.1	10,514	21.2	8,342
St. John d'El Rey†	31.1	140	3	87.4	379	84.0	350.5

* Cu. yds. dredged.

† Estimated value (£000).

COAL OUTPUT

Company	March (in tons)	Months Since Year End	Cumulative Totals (in tons)	
			This year to date	Last year to date
Amal. Coll. of S.A.	551,342	3	1,610,513	1,724,326
Apex	78,190	3	230,923	251,970
Blesbok	52,453	3	153,529	124,698
Coronation	85,590	3	239,636	276,292
New Clydesdale	82,018	9	717,922	661,614
New Largo	107,609	3	321,376	235,136
S.A. Coal Est.	144,962	9	1,261,208	1,219,542
Springbok	70,970	3	214,294	218,338
Van Dyks Drift	59,769	3	173,337	181,526
Vierfontein	134,184	3	369,199	316,104
Vryheid Cor.	52,506	3	156,928	138,609
Vryheid Cor.*	41,648	3	125,270	109,062
Wankie Coll.	319,991	7	2,027,047	2,023,575
Wankie Coll.*	19,207	7	129,051	118,680
Witbank	150,785	3	440,071	442,338

* Coke.

OIL OUTPUT

Company	March (in tons)	Months Since Year End	Cumulative Totals (in tons)	
			This year to date	Last year to date
Anglo Ecuadorian	28,308	12	327,621	328,560
Apex Trinidad	37,480	6	216,229	225,988
Attock Oil	51,007	3	51,007	46,841
Kern Oilfields	29,078	10	268,388	265,537
Kuwait Oil	4,408,713	2	9,120,608	8,354,713
Lobitos Oil	43,487	3	129,836	131,641
Qatar Petroleum	475,134	2	956,953	812,814
Trinidad Central	8,524	3	23,181	25,493
Trinidad Leaseholds	76,018	9	707,850	719,935
Trinidad Petroleum	50,639	8	379,728	326,242
Ultramar Oil*	107,996	3	322,428	331,228

Note: 1 ton taken to equal seven barrels.

* Output figures are for S.A.P. Las Mercedes in which Ultramar holds a 50 per cent interest.

INTERNATIONAL NICKEL COMPANY OF CANADA

MOST SUCCESSFUL YEAR IN COMPANY'S HISTORY ORE RESERVES AT NEW HIGH LEVEL

The annual meeting of The International Nickel Company of Canada, Ltd., was held on April 25 at Toronto.

Dr. John F. Thompson, the chairman, in the course of his address said: The year 1955 marked the fiftieth anniversary of Canada's leadership in world nickel production. The combined total deliveries of this important metal by all Canadian producers were at a record high estimated at 357,000,000 pounds, or somewhat over 80 per cent of the free world supplies.

In 1955, International Nickel enjoyed the most successful year in its history, with high deliveries of the Company's two principal products—nickel and copper—and increased output of most of the other elements obtained from its ores. Net earnings and common dividend payments exceeded those of any previous year.

FINANCIAL

Net Earnings.—Net earnings of \$91,566,000 in 1955 were \$26,271,000 higher than the previous peak established in 1954. The largest single contributing factor in this substantial increase was the high price prevailing for copper, the Company's second most important product, deliveries of which were at a post-war high. Also contributing to the increased earnings were record nickel deliveries, the higher price for refined nickel prevailing since November, 1954, and greater deliveries of such by-products as platinum metals and cobalt.

Dividends.—Common dividend payments in 1955 of \$54,668,000, or \$3.75 a share, were the highest for any year. The 200th consecutive quarterly dividend on the preferred shares was paid in November, 1955. The preferred dividend payments for the year amounted to \$1,934,000.

Capital Expenditure.—Reflecting the growing necessity of employing increasingly larger amounts of money in conducting a business, our capital expenditures in 1955 exceeded those of any previous year. Expenditure of \$26,894,000, of which \$23,686,000 were spent in Canada, compare with total expenditures in 1954 of \$22,257,000 and in the previous high of \$23,737,000 in 1951. Capital expenditures of \$25,000,000 to \$30,000,000 are estimated for 1956.

NICKEL

Price.—The belief that nickel prices should not be dominated by short-term considerations to the detriment of the necessarily long-term planning by nickel consumers has been an important factor in the progress of the nickel industry. In making necessary price adjustments from time to time, International Nickel has made every effort to follow rising cost trends as conservatively as possible, always bearing in mind that nickel-containing products are competitive with many that are made of other metals and materials and must be priced competitively if the position of consumers of nickel is not to be jeopardized. The Company, therefore, is continuing its long-established policy of selling at prices which encourage the development and expansion of uses for nickel. We believe that the future, as nickel supply and demand come into balance, will confirm the wisdom of this policy.

The Company's United States base price for nickel was increased by 4½ cents to 64½ cents (United States) per pound effective November 24, 1954, and continued at that level throughout 1955. This price includes the 1½ cents United States import duty which is paid by the Company. The increase was reflected in earnings for the year. To compensate for changes in foreign exchange rates and to keep the Canadian domestic price of nickel in accord with Canada's basic export price, adjustments in price for consumption in Canada, were made during 1955.

SUPPLY

It has been estimated that about 40 per cent. of the free world's available supply of nickel is currently absorbed by free world defence and United States stockpiling requirements. Of the 1955 total free world supply, including both commercial production and government subsidized production, approximately two-thirds went to the United States and one-third to Canada, the United Kingdom and other countries of the free world.

DISTRIBUTION

Distribution of our nickel in 1955 was again guided by the principle that adequate supplies must be made available to meet defence production requirements and government stockpile commitments, and that civilian customers in all parts of the free world must receive fair and equitable treatment. It is vital to

the Company's present and future well-being that we so conduct this activity as to make clear to all customers, both civilian and governmental, that we are doing our best to follow faithfully such a policy.

PRINCIPAL FREE WORLD NICKEL PRODUCERS

Estimated total free world production of nickel in 1955 attained a new high of about 430,000,000 pounds. International Nickel deliveries amounted to 290,000,000 pounds, not including approximately 8,000,000 pounds refined on toll for Sherritt Gordon Mines Limited and additional amounts processed from materials supplied by others. Estimates of 1955 deliveries by other principal Canadian producers are: Falconbridge Nickel Mines Limited, 42,000,000 pounds, and Sherritt Gordon Mines Limited, 17,000,000 pounds. Other free world supplies came chiefly from the United States Government's plant at Nicaro, Cuba, 30,000,000 pounds; Hanna Nickel Smelting Company in Oregon, 6,500,000 pounds; and from New Caledonia ores, 35,000,000 pounds, of which some 13,000,000 pounds were refined in Japan. The foregoing figures are based upon company or government reports or other published statements.

COPPER

Deliveries.—Copper is International Nickel's second most important product. Deliveries of refined copper in 1955 amounted to 263,000,000 pounds, a post-war high, and an increase of almost 10,000,000 pounds over 1954.

Price.—Primary copper sold at new high prices during 1955. Strikes in the copper-producing industries of the United States, Chile and Africa caused production losses and this, with the record demand, resulted in higher prices and a tight market. As increases in production come into the market during the current and coming years there should be a better balance between supply and demand.

PLATINUM METALS

Deliveries of platinum metals by International Nickel in 1955 set a new high record at 445,000 ounces, a gain of 182,000 ounces over 1954. The United States continued as the largest market, with the United Kingdom, several Continental European countries and Canada also being important consumers.

Palladium demand increased substantially in 1955. The use of this precious metal was extended in several industrial fields.

OTHER BY-PRODUCTS

In February, 1956, we began the sale of high-grade iron ore from the first unit of the Company's iron ore recovery plant near Copper Cliff.

Our high-purity electrolytic cobalt has been favourably received by the trade since production was initiated at the Port Colborne, Ontario, refinery in 1954. Cobalt deliveries in all forms of 1,637,000 pounds in 1955 set a new high record and compared with 1,317,000 pounds in the previous year. Sales by our United Kingdom affiliate increased about 10 per cent.

Other by-products recovered from our ores include, gold, silver, selenium and tellurium. Extreme shortages of selenium continued during 1955 and prices increased substantially.

Plant Operations.—The Company's smelters and refineries again operated at capacity throughout 1955. To make all possible contribution to current nickel supplies, International Nickel will again this year operate at maximum capacity.

Exploration.—International Nickel's expenditure for exploration over the past 10 years totalled \$31,000,000, distributed approximately as follows: \$2,500,000 for geophysical work, principally airborne, \$11,500,000 for surface diamond drilling and \$17,000,000 for all other exploration. The average annual rate of expenditure for this purpose over the past three years has been approximately \$5,500,000, contrasted with an average of about \$2,000,000 annually in the preceding seven years.

OUTLOOK

For our consumers, the future of nickel supply is a vital question. It is an almost impossible question to answer with assurance since many conflicting factors, including defence demands, purchasing for stockpile, general industrial activity and the coming into production of new nickel-producing facilities, play such a vital part. However, the facts that free world nickel production will probably increase and that purchasing for stockpile may be moderated suggest that there should be more nickel available for industry in 1956 and even more in 1957.

The results of our first quarter operations will be mailed to all shareholders and released to the Press next month. Although exact figures are not yet available, sufficient is known to permit me to say that earnings for the first quarter will exceed those of the comparable period of 1955, which were the highest for any first quarter. All indications are that again in 1956 the Company will make an excellent showing.

The report and accounts were adopted.

THE SCOTTISH AUSTRALIAN MINING CO., LTD.

The Annual General Meeting of Members of the Scottish Australian Mining Company, Limited, was held in London on April 20.

Mr. John Norman Eggar, Chairman of the Company, who presided in the course of his speech said:—

At last years' Meeting I mentioned the very lean time which the small collieries producing coal from the Victoria tunnel seam were having and warned you that the outlook for the three collieries—Crofton, Lambton Central, and Borehill—was not at all encouraging. I regret to say that the situation deteriorated greatly during the year under review, and the falling off in trade was such that Crofton Colliery's output was lower by 7,855 tons; Lambton Central's by 7,972 tons, and Borehill's by 1,519 tons. The total output from the three collieries fell from 86,679 tons to 69,333 tons, and but for the efforts of the Agent in Newcastle, Mr. Tonkin, the position would have been worse. Since the turn of the year the Crofton Colliery has closed down altogether, and according to the best advice available there is very little likelihood of a revival in the foreseeable future. Lambton Central is only producing 20 to 30 tons per week. The lessee of the Borehill Colliery has wisely insisted on the cleaning of his coal being carried out in a thorough manner. Consequently he has a better market and is able to carry on for the present, although his output for the first three months of the current year is at the rate of only 12,000 tons per annum against 18,000 tons for the first three months of last year. Whereas the best steam coal from the Borehole Seam and gas coal from the Greta and Maitland Seams still find a ready market, consumers have very little use for coal from the Victoria Tunnel Seam. Oil is being increasingly consumed in industry and the coal bunkering trade in which this Company was largely engaged in years gone by is almost a dead letter, for almost all ships in the long trades now burn oil.

As regards land sales, continuing the policy I outlined at our last Meeting we have disposed of 332 acres, realizing £41,832 net as mentioned in the Report. One sale was for cash, the others being by quarterly instalments over 2½ years. We were thus enabled to distribute since the last Meeting an amount equal to 2s. 9d. per Unit. Since the Report was issued, further 76 acres have been sold for a net return of approximately £13,200 on terms extending over 2½ years.

Profit for the year amounted to £1,043 compared with £988 in 1954.

Rents, royalties, interest, etc., decreased by £355. Revenue from royalties fell by £1,120 because of the reduced output, but an increase of £765 in interest on land purchases and deposit accounts cushioned the fall in royalties.

The Municipal Rate levied on Lambton land was reduced by 1½d. in the £, but the main reason for the reduction of £982 lies in the smaller area remaining in our possession.

United Kingdom and Australian taxation absorbs £947 as against £1,106, a decrease of £159.

Freehold Property shows a decrease of £1,750 as a result of the sale during the year of 332 acres.

During the year £3,084 worth of the Company's investments, other than Commonwealth Loans, were sold, yielding a surplus of £2,593 which was transferred to General Reserve.

Debtors and Pre-payments are up by £14,779, due largely to increase in amount outstanding from purchasers of land.

Deposit at Call, together with Balances at Bankers and Cash in hand amounted to £38,219 compared with £13,668 at December 31, 1954.

Movements on Reserves are set out in the Balance Sheet. In view of the excess of market value over book value of investments, which at December 31, 1955, amounted to £3,325, the balance of Investments Reserve, £391, has been transferred to General Reserve.

The capital distribution of 9d. per Unit paid on April 4, 1956, part of which is met by surpluses on land sales realized since December 31, 1955, and included in Land Sales Suspense Account at that date, absorbed £9,375.

As regards the future, I may tell you that subject to overcoming the difficulties over title, we are hopeful of disposing of some 300 acres in the near future but we cannot expect a price of more than £72 per acre for country which is full of gullies and pitfalls. The area includes the two collieries still in operation.

There will be substantial reduction in general administration expenses, rates and royalties. I hope there may be a balance of £1,000 before taxation at December 31 next.

The Report and Accounts were adopted.

TRANSVAAL CONSOLIDATED LAND AND EXPLORATION COMPANY, LTD.

(Incorporated in the Union of South Africa)

AUTHORIZED AND ISSUED CAPITAL—£465,119 in 930,238 Shares of 10/- each

The Report and Accounts for the year ended December 31, 1955, contain, *inter alia*, the following information:

PROPERTY—At December 31, 1955, the Company's holding of farm property and mineral rights in the Transvaal comprised:—
Freehold and mineral rights 111,872 acres
Mineral rights only 3,429,269 acres
together with interests with other Companies in sundry freehold and mineral rights in the Pilgrims Rest district of the Transvaal.

The Company's holding of Township land in the Johannesburg Municipal Area comprised the freehold of 31,548 acres of residential plots in townships, sold in leasehold.

Investments—The shares and debentures have been taken into account at a book value of £523,815, a net increase of £73,926 compared with the total at the end of the previous year, after allowing for a credit adjustment of £1,889 in respect of depreciation. All investments with Stock Exchange valuations appear in the books at cost or market value at 31st December, 1955, whichever was the lower; unquoted securities have been valued at cost or in accordance with the conservative valuation placed on them by the Directors, whichever was the lower. The market value of the quoted investments at December 31 1955, was £697,767.

MINERAL INTERESTS

Tributes—The royalties derived from properties let on tribute totalled £131,890 mainly in respect of the working of asbestos, chrome and tin deposits.

The Platinum Prospecting Company (Proprietary) Limited issued 75,000 £1 reserve shares at par to its shareholders, of which this Company took up its proportion of 33,750 shares. The Platinum Company continued the underground exploration of the Brakspruit property. Metallurgical tests on the treatment of the ore are being carried out.

Winterveld (T.C.L.) Chrome Mines (Proprietary) Limited—During the year the Company entered into an arrangement with The Johannesburg Ore Company (Proprietary) Limited in terms of which Winterveld (T.C.L.) Chrome Mines (Proprietary) Limited was registered on 6th March, 1956, with an issued capital of £50,000 to exploit the chrome deposits on portions of the farms Winterveld No. 424 and Doornbosch No. 423 in the district of Lydenburg. Under the arrangement this Company has granted the new company a tributing agreement over the relative portions of the farms concerned on suitable royalty terms, and The Johannesburg Ore Company has transferred its railway truck allocation to the new company, in the capital of which this Company has subscribed for a 75 per cent interest and The Johannesburg Ore Company for the remaining 25 per cent. Work on opening up the mine commenced towards the end of the financial year.

OPERATIONS

Van Dyks Drift Colliery—The quality of coal produced during the year has remained consistently high and mining conditions have been generally good.

The supply of railway trucks improved considerably during the year and shortages were experienced only for short periods during the mid-year months. With these exceptions coal was produced from the six available districts throughout the year, and for some months the colliery operated at peak capacity.

CURRENT ASSETS

Mortgage Bonds and Other Securities	£10,961	
Stores	49,310	
Debtors and Payments in Advance	164,976	
The Transvaal Coal Owners Association (1923), (Proprietary) Limited	39,371	
Deposits, Fixed and On Call	580,388	
Cash at Bankers and in Hand	24,036	869,042

Deduct: Provisions and Liabilities:—

Provision for claims in respect of forfeited dividends	12,241	
Provision for Taxation	85,735	
		97,976
Shareholders—Dividends	122,911	
Creditors	37,955	258,842
		£610,200

EXTRACT FROM INCOME AND EXPENDITURE ACCOUNT

Profit before Taxation	£339,412
Taxation	83,057
Profit after Taxation	256,355
Balance of income and expenditure account at 31st December, 1954	557,129
	£813,484
This amount has been dealt with as follows:—	
Dividend No. 33 of 2s. 6d. per share	116,280
Balance of income and expenditure account at December 31, 1955	£697,204

The full Report and Accounts may be obtained from the London Secretaries, A MOIR & CO., 4 London Wall Buildings, E.C.2.

RAND MINES LIMITED

(Incorporated in the Union of South Africa)

SUMMARISED BALANCE SHEET, 31st DECEMBER, 1955

CAPITAL AND RESERVES	
Share Capital—Authorized 2,200,000 Shares of 5s. each, £550,000	£
Less held in Reserve, 49,005 Shares of 5s. each £12,251	
Issued—2,150,995 Shares of 5s. each	537,749
Revenue Reserves—For Investments £7,814,140; For Exploration £293,458; For Retiring Gratuities £85,000; Profit and Loss Account—Balance at December 31, 1955 £414,619	8,607,217
	£9,144,966
PROPERTY AND NET ASSETS	
Investments—	
Quoted Shares, Debentures, etc., at Cost or Stock Exchange valuation, whichever is the lower (Market Value—£10,738,510)	7,472,009
Unquoted Shares and Debentures at Cost or Directors' valuation whichever is the lower	449,954
	7,921,963
Government, Municipal and Public Utility Stocks and Debentures to secure Corner House Pension Fund Deposit £1,041,973; Less Deposit by Trustees of Pension Fund £1,039,000	2,973
	7,924,936
Fixed Assets—	
Trade Investments at Cost	1,159
Freehold Properties, etc.	42,888
Furniture, Plant, Vehicles, Aircraft, etc.	90,586
Subsidiary Companies—	
Shareholdings £71,527; Loans £18,200	89,727
Current Assets—	
Stores £13,580; Debtors, Loans and Payments in Advance £135,259; Dividends Receivable £308,814; Cash Deposits, Fixed and On Call £1,049,783; Cash at Bankers and in Hand £55,759	1,563,195
Deduct Liabilities and Provisions: Creditors £159,564; Shareholders—Dividends £359,845; Subsidiary Companies—Current Accounts £1,037 Provision for Claims in Respect of Forfeited Dividends £47,079—£567,525	995,670
	£9,144,966

EXTRACT FROM PROFIT AND LOSS ACCOUNT

PROFIT BEFORE TAXATION	650,261
Transvaal Provincial Tax	8
PROFIT AFTER TAXATION	650,253
BALANCE OF PROFIT AND LOSS ACCOUNT at December 31, 1954	1,882,777
	2,533,030
Deduct: Dividends—Nos. 104 of 2s. 9d. and 105 of 3s. 0d. per share—£618,411	
Amount transferred to Investment Reserve £1,500,000	2,118,411
BALANCE OF PROFIT AND LOSS ACCOUNT, at December 31, 1955, transferred to Balance Sheet	414,619

The full Report and Accounts may be obtained from the London Secretaries, A. MOIR & Co., 4 London Wall Buildings, London, E.C.2.

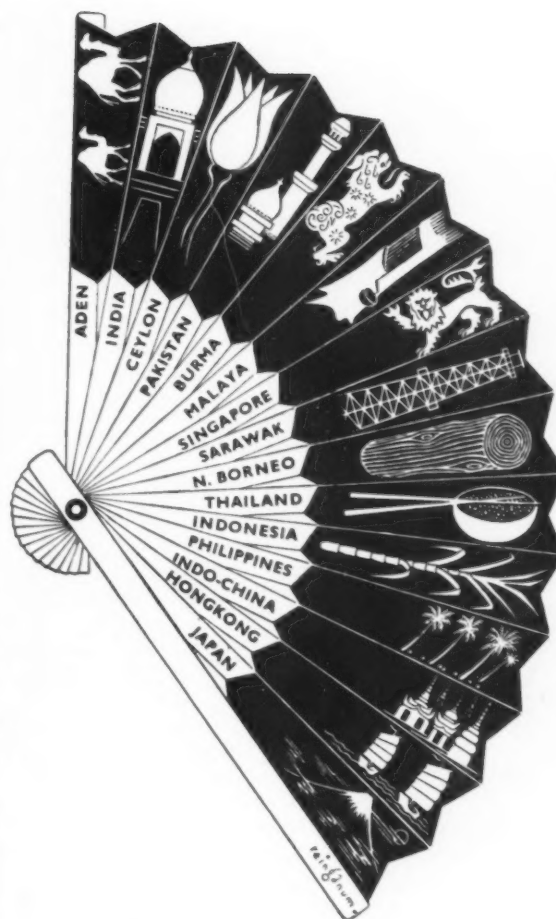
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Duties: Mineral dressing tests on batch and pilot plant scale. Advice to private operators on milling problems. Pilot mill design. Sampling of tailings, dumps and mill products. Cyanidation of gold ores. Occasional short visits to mines.

Terms of appointment: Pensionable emoluments in the scale £816-£1,620 p.a. 10 per cent cost-of-living allowance. Outfit allowance £45. Furnished quarters when available at rental. Free passages on appointment and on leave. Generous leave. Income tax at local rates.

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- - - - - £4,000,000
- - - - - £2,500,000
- - - - - £1,900,000

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Kumasi
Kumasi (Kejetia)
Oda
Sekondi
Sunyani
Swedru
Takoradi—(Harbour)
Takoradi—
(Market Circle)

Tamale
Tarkwa
Tema
Tepa
Wa
Winneba
Yendi

CAMEROONS —
Duala

NIGERIA —

Aba
Abeokuta
Apapa
Benin
Bukuru
Calabar
Enugu
Gombe
Gusau
Ibadan
Ikeja

Ilesha
Jos
Jos (Market)
Kaduna
Kano
Kano—(Airport)
Kano—(Fagge)

Kontagora
Lagos—(Marina)
Lagos—(Broad St.)
Lagos—(Ereko St.)

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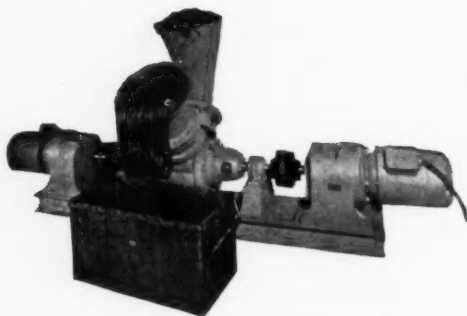
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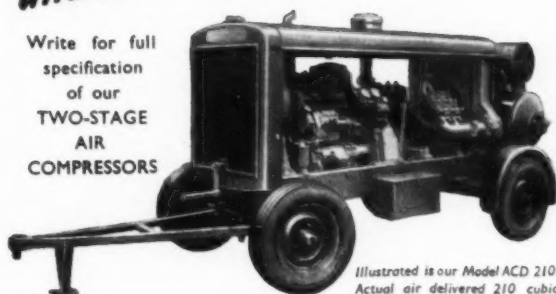
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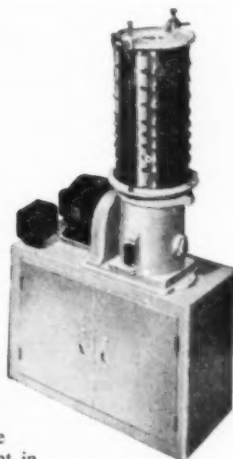
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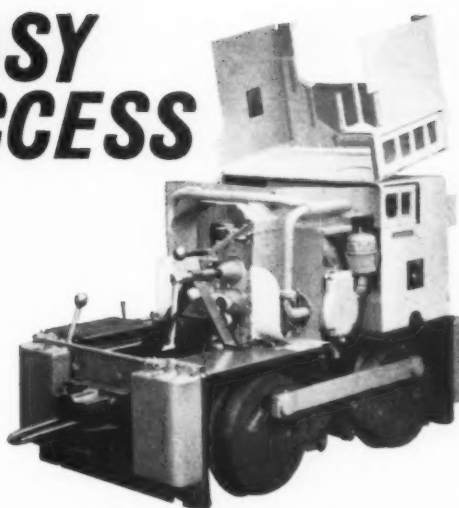


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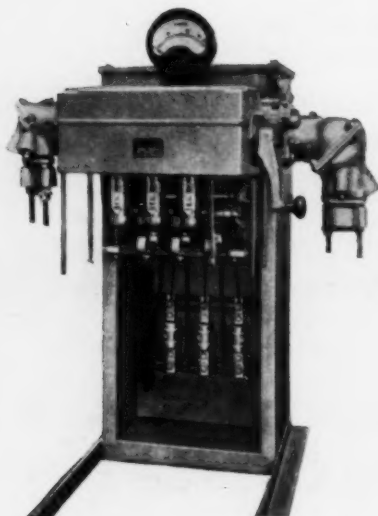
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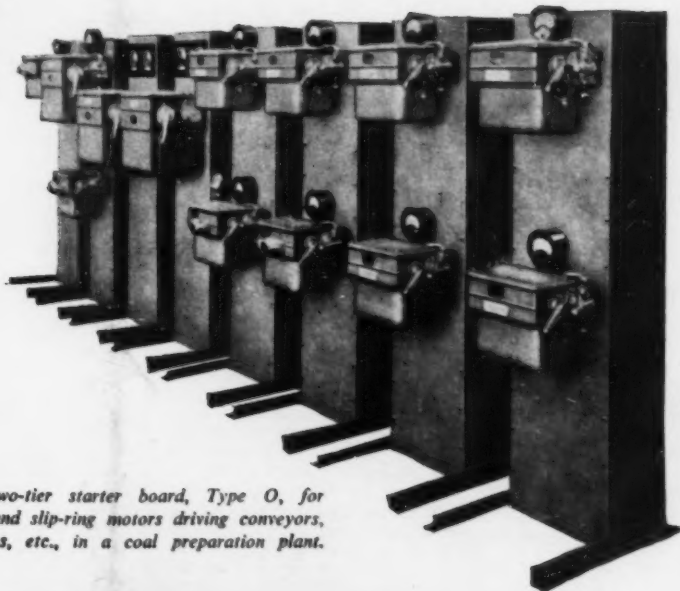
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